ATTACHMENT 2

WASTE ANALYSIS PLAN

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LIST OF ACRONYMS	
Acronym	**Definition**
ACS	Agent Collection System
AQS	Agent Quantification System
BRA	Brine Reduction Area
BTU	British Thermal Unit
CAL	Chemical Assessment Laboratory
CAMDS	Chemical Agent Munitions Disposal System
CTC	Cutaway Ton Container
DFS	Deactivation Furnace System
DCD	Deseret Chemical Depot
DSHW	Division of Solid and Hazardous Waste
DVS	Drum Ventilation System
DVSSR	Drum Ventilation Sorting System Room
ECR	Explosive Containment Room
EPA	Environmental Protection Agency
GB	Sarin, Isopropyl methylphosphonofluoridate
GC/MS	Gas Chromatography/mass spectrometry
H/HD/HT	Sulfur Mustard[1]/Distilled Sulfur Mustard/Distilled Mustard with 40% Bis[2-(2-chloroethylthio)-ethyl] ether
HDC	Heated Discharge Conveyor
HEPA	High Efficiency Particulate Air
HRA	Hazard Risk Assessment
LIC	Liquid Incinerator
MDB	Munition Demilitarization Building
mg/m^3	Milligrams per cubic meter
MPF	Metal Parts Furnace
MSB	Monitor Support Building
ONC	On-site Container
PAS	Pollution Abatement System
PCB	Polychlorinated Biphenyl Compounds
ppb	Parts per billion
ppm	Parts per million
RCRA	Resource Conservation and Recovery Act
RHA	Residual Handling Area
SDS	Spent Decontamination System
Subtitle C TSDF	Hazardous Waste Treatment, Storage and Disposal Facility
TC	Toxicity Characteristic or Ton Container
TCLP	Toxic Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TMA	Toxic Maintenance Area
TOCDF	Tooele Chemical Agent Disposal Facility
TSCA	Toxic Substance Control Act
TSDF	Treatment, Storage and Disposal Facility
TSS	Total Suspended Solids
UPA	Unpack Area
UPMC, UMC	Upper Munitions Corridor
VOC	Volatile Organic Concentration (BB/CC)
VX	O-ethyl-S-[2-diisopropylamino)ethyl] methyl phosphonothiolate
WCL	Waste Control Limit
WIC	Waste Incineration Container
Note: 1 Sulfur Mustard = Bis(2-Chloroethyl) Sulfide or 2,2'-Dichlorodiethyl Sulfide	

2.1. INTRODUCTION

2.1.1. Generators of hazardous waste are required to obtain detailed chemical analyses of wastes they intend to treat, store, or dispose of in order to ensure proper hazardous waste management practices.

2.1.2. This Waste Analysis Plan describes:

2.1.2.1. The physical and chemical analyses the Permittee shall perform before hazardous wastes are stored, treated, or transported off site for further treatment and ultimate disposal,

2.1.2.2. The methods and frequency to be used to collect and analyze samples,

2.1.2.3. The procedures that will be used to ensure the validity of the analytical results, and

2.1.2.4. The basis for generator knowledge.

2.1.2.5. Tables 2-0 and 2-1 present a summary of this entire waste analysis plan. For each waste stream specified, these tables present the selected analytical parameters and corresponding analytical methods, sampling frequencies, and sampling methods. In addition the tables include either a reference to the unit that will treat each waste stream (for waste to be treated on site) or a reference to the process generating each waste stream (for wastes to be treated and disposed of off site).

2.2. PARAMETERS AND RATIONALE 40 CFR 264.13(b)(1) [R315-8-2.4]

2.2.1. Analyses for Wastes Requiring On-Site Treatment

2.2.1.1. Waste streams included in this section are treated on site in one or more of the four incinerators. Analytical parameters were selected for each waste stream based on previous analytical results obtained for similar waste streams, the homogeneity of the waste and the ability to obtain a representative sample, and/or government manufacturing specifications (in regards to munition energetic components).

2.2.1.2. The Permittee shall determine the hazardous constituents in the waste streams to be treated on site. The Permittee shall also determine the underlying hazardous constituents as applicable in 40 CFR 268.9. For wastes to be treated on site, which are not included in Table 2-0, the Executive Secretary shall be notified of the most appropriate management practices including treatment methods and appropriate waste analyses. This notification shall be in writing and occur within seven days from the time when the Permittee determines a waste has been generated that is not included in Table 2-0. The Executive Secretary will determine if the chosen treatment is acceptable.

2.2.1.3. Chemical Agents GB, VX, Mustard (HD/H/HT)

2.2.1.3.1. Previous analyses of chemical agents have identified agent breakdown products and organic stabilizers (referred to collectively as agent organic content), and metal constituents. Data compiled from these previous analyses have been used to establish expected ranges for agent organic content (see Table 2-A-2) and metal constituents.

2.2.1.3.2. The Permittee shall analyze the chemical agent prior to each agent campaign from bulk containers. Agent samples shall be collected from a representative number of bulk containers agreed upon with the DSHW. The containers shall be sampled and analyzed following an approved sampling and analysis plan.

2.2.1.3.3. At the beginning of each munition or bulk container campaign, agent samples shall be collected using a sampling scheme that is approved by the Executive Secretary. The samples shall be analyzed as specified in Table 2-0.

2.2.1.3.4. Metals included in the HRA list are Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Thallium, Tin, Vanadium, and Zinc.

2.2.1.3.5. The metals analysis associated with the agent waste profile will be accomplished using the methods described in Tables 2-0 and 2-3. The metal analytes quantified will be the HRA metals listed in Paragraph 2.2.1.3.4.

2.2.1.3.6. Baseline Mustard Ton Containers

2.2.1.3.6.1 Prior to TOCDF receipt of Mustard ton containers, each TC shall have been sampled and analyzed at DCD Area 10 in accordance with the Area 10 Sampling Program.

2.2.1.3.6.2 During the LIC ATB shakedown for baseline Mustard ton containers, each week one sample shall be collected from the ACS tank and analyzed for HRA metals, agent organics content and density, provided the ton container's liquid contents have been previously sampled and analyzed at Area 10 for HRA metals and shown to contain less than one part per million of mercury (< 1 ppm (mg/kg)).

2.2.1.3.6.3 During LIC post-ATB and long-term incineration processing of Mustard baseline ton containers, the DCD Area 10 liquid Mustard sample analyses results will be used by TOCDF for characterization for the liquid Mustard in the baseline ton containers

2.2.1.3.6.4 During the MPF ATB shakedown for baseline Mustard ton containers, sludge/solid samples will be collected in accordance with the MPF Mustard Trial Burn Plan.

2.2.1.3.6.5 The metals analysis associated with the agent samples collected in compliance with Paragraph 2.2.1.3.6. may be performed using either the site specific or the SW-846 methods described in Tables 2-0 and 2-3. Analytes quantified by the SW-846 methods shall be those HRA metals listed in paragraph 2.2.1.3.4.

2.2.1.3.6.6 Reserved.

2.2.1.3.6.7 Based on the results of the agent sampling and analytical, agent feed rates to the incinerators shall be adjusted, as necessary, to ensure continued compliance with the metal feed rate limits.

2.2.1.3.6.8 For each agent organic analysis and metals analysis, a summary of the results shall be submitted to the Executive Secretary monthly.

2.2.1.3.6.9 Appendix A of this waste analysis plan contains the following information regarding the chemical agents to be incinerated at the TOCDF:

2.2.1.3.6.9.1 Table 2-A-1: Physical Properties of Chemical Agent (as a pure substance)

2.2.1.3.6.9.2 Table 2-A-2: Chemical Agent Composition

2.2.1.3.7 Mustard 155mm Projectiles

2.2.1.3.7.1 The initial characterization and continuing processing verification sampling will be performed in accordance with the plans approved by the Executive Secretary.

2.2.1.3.7.2 If variation of the agent in the initial characterization sampling is found outside the specified limits in the sampling plan, modifications of the initial and verification sampling may be required as determined by the Executive Secretary.

2.2.1.3.7.3 Thirty additional samples will be collected from lots specified in the Mustard 155mm Projectile Sampling Plan for continuous verification for a total of 15 samples or 30 total for both liquid and solid matrices. One additional verification sample set shall be collected and analyzed quarterly until the end of the projectile campaign.

2.2.1.3.7.4 Each verification sample set shall consist of one solid and one liquid sample from each of five separate projectiles for a total of 10 samples per verification sample set (five solid and five liquid).

2.2.1.3.7.5 Each liquid sample from each verification sample set from the projectiles specified in 2.2.1.3.7.3 and 2.2.1.3.7.4 shall be analyzed for agent organic content (i.e., purity and impurities), and HRA metals (and chlorine for the quarterly samples).

2.2.1.3.7.6 Each solid sample from each verification sample set from the projectiles specified in 2.2.1.3.7.3 and 2.2.1.3.7.4 shall be analyzed for HRA metals (and chlorine for the quarterly samples).

2.2.1.3.7.7 Analysis results shall not necessarily be available prior to MPF treatment of the sampled projectiles.

2.2.1.3.7.8 Sample verification analyses results will be immediately sent to the DSHW Chemical Demilitarization Section Manager at the same time results are reported to EG&G.

2.2.1.3.8 4.2 Inch HT Mortars

2.2.1.3.8.1 The initial characterization will be performed in accordance with the Sampling and Analysis Plan approved by the Executive Secretary.

2.2.1.3.8.2 Phases II and III of the Sampling and Analysis Plan will be determined after the results from the previous phase has been evaluated by the Executive Secretary.

2.2.1.3.8.3 Initial characterization samples results must be approved prior to processing the agent in the LICs in Phase I, II and III for metals. The 4.2 inch HT mortar trays may be processed in the MPF during Phase I prior to receiving the analytical results.

2.2.1.3.8.4 Sample verification analyses results will be immediately sent to DSHW at the same time results are reported to EG&G.

2.2.1.3.8.5 On liquid mustard (HT) sample will be collected from an ACS tank once per week throughout the HT campaign and analyzed for metals. Every fifth sample collected will also be analyzed for organic content. The Executive Secretary my revise this sampling frequency of analysis based on results obtained from performance of the 4.2 inch HT Sampling and Analysis program.

2.2.1.4. Spent Decontamination Solutions

2.2.1.4.1. Spent decontamination solutions treated on site shall be treated in the primary or secondary chambers of the LICs.

2.2.1.4.2. Spent decontamination solution collected in SDS-TANK-101, SDS-TANK-102, or SDS-TANK-103 shall be sampled and analyzed per Table 2.0 Section 2.2.1.4. Spent decontamination solutions shall be analyzed for chemical agent concentration, corrosivity (pH), specific gravity, HRA metals, TCLP, and screened for organics by weight.

2.2.1.4.2.1 The parameters of agent concentration, pH, specific gravity, and the organic screen shall be determined for each tank of spent decontamination solution processed. The results shall be available prior to incineration.

2.2.1.4.2.2 Confirmatory analyses for HRA metals, TCLP organics and explosives (if processing explosive munitions) in spent decontamination solutions shall be performed quarterly.

2.2.1.4.2.3 The sampling and analyses of spent decontamination solutions for the purpose of demonstrating compliance with Subpart CC regulations shall be performed as described in Section 2.10 of this attachment.

2.2.1.4.3. If results of the organic screen show that the spent decontamination solution contains organics in excess of five percent, the tank of spent decontamination solution shall be analyzed per Table 2-0. The Executive Secretary shall be notified prior to treatment of the solution.

2.2.1.4.4. If chemical agent is detected above the Waste Control Limit (WCL) (i.e., 20 parts per billion (ppb) for GB, 20 ppb for VX, and 200 ppb for Mustard), additional decontamination solution shall be added to the tank, the contents of the tank shall be recirculated (i.e., mixed), and another sample shall be analyzed for agent. This procedure shall be repeated until the chemical agent concentration is below the limits specified above.

2.2.1.5. Agent Collection System (ACS) & Agent Quantification System (AQS), Spent Decontamination System (SDS) Maintenance Residues

2.2.1.5.1 The chemical agent contaminated debris and sludges generated from the maintenance of the ACS, AQS, and SDS equipment located in the Munitions Demilitarization Building (MDB), but outside the Explosive Containment Rooms (ECRs), can be incinerated in the Metal Parts Furnace (MPF).

2.2.1.5.1.1. ACS tank bottoms shall be characterized prior to treatment in the MPF. Samples shall be analyzed for HRA metals.

2.2.1.5.2. Collected ACS/AQS maintenance residues shall be weighed and characterized prior to incineration to ensure feed rates established for the MPF are not exceeded. The Operating Record shall include a detailed description of the residues fed to the MPF.

2.2.1.5.3. ACS/AQS/SDS maintenance residues shall be properly managed prior to treatment in the MPF.

2.2.1.5.4 ACS, AQS and SDS sludge shall be categorized as Agent Contaminated Sludge and managed as specified in paragraph 2.2.1.18.

2.2.1.6. Secondary Waste Noncombustible Bulk Solid Waste Category

2.2.1.6.1. Noncombustible Bulk Solid Secondary Waste is composed of inert material that does not combust when placed into the incinerator. Examples of this waste are discarded components of MDB process equipment, and carbon filter trays (from which all carbon has been removed).

2.2.1.6.2. The physical state of these wastes (i.e., debris) prevents the collection of a representative sample. All wastes included in this category are described by the Utah Hazardous Waste code P999. Other waste codes may apply based on generator knowledge.

2.2.1.6.3. Wastes included in this category shall be placed onto MPF burn trays or thermally treated ton containers that have been cut in half (cutaway ton containers or CTC) or Waste Incineration Containers (WICs). All wastes shall be weighed and characterized prior to being treated in the MPF to ensure compliance with this Permit. The Operating Record shall include a detailed description of the residues fed to the MPF in each burn tray, WIC or CTC.

2.2.1.6.4. Noncombustible Bulk Solid Wastes shall be properly managed prior to treatment in the MPF.

2.2.1.6.5. Management of Noncombustible Bulk Solid Waste shall be in accordance with paragraph 2.2.1.6 prior to treatment in the MPF.

2.2.1.6.6. Additionally, these wastes included in this category may be processed in the Autoclave (Igloo 1631) provided an approved function test has been demonstrated and approved by the Executive Secretary.

2.2.1.6.7. For Autoclave processing, the TOCDF operating record shall include an entry for each secondary waste drum processed in the Autoclave. Each of these entries will include a description of the waste, type of container, the total weight waste, the volume of the container storing the waste, the hazardous waste label number, and the time and date the waste was processed in the Autoclave per Module VIII.

2.2.1.7. Drained Bulk Containers & Undrained Mustard 155mm Projectiles with Agent Residue

2.2.1.7.1. Drained bulk containers and projectiles with chemical agent residue (heel) shall be treated in the MPF. Previous analytical results show some of the chemical agent to contain concentrations of metals. In addition, the paints used on the containers and projectiles have metal-containing pigments.

2.2.1.7.2. The chemical agents and item surface coatings (i.e., paint) are both organic matrices containing metal constituents. Metal constituents contained in organic matrices are referred to as non-embedded metals. Non-embedded metals may potentially volatilize during incineration.

2.2.1.7.3 Appendix B contains the following tables regarding the metals associated with each type of chemical agent munition and bulk container to be treated at the TOCDF:

2.2.1.7.3.1 Table 2-B-1: Metals in Munitions (presents by munition or bulk container, the total metal loading for non-embedded metals whose emission rates are regulated by this Permit).

2.2.1.7.3.2 Table 2-B-2: Metals in Munitions (presents, by munition or bulk container, the total metal loading for non-embedded metals whose emission rates are considered in the TOCDF HRA).

2.2.1.7.4 Data included in these tables can be used to determine the quantity (and associated feed rate) of non-embedded metals fed to the incinerator.

2.2.1.7.5 Mustard 155mm projectiles are included for the purposes of the Waste Analysis Plan; however, the mustard 155mm projectiles are not required to be drained prior to incineration in the MPF.

2.2.1.8. Energetic Munition Components

2.2.1.8.1. Energetic munition components shall be incinerated in the DFS.

2.2.1.8.2. The Permittee may use generator knowledge to determine the type and amount of explosive and propellant being fed to the DFS.

2.2.1.8.3. Appendix C contains the following tables pertaining to explosive/propellant and agent fill weights and compositions:

2.2.1.8.3.1. Table 2-C-1: Energetic/Agent Nominal Weight for Chemical Agent Munitions and Bulk Containers

2.2.1.8.3.2. Table 2-C-2: Composition of Reactive Material in Munitions

2.2.1.8.4. Explosive formulations are organic matrices containing metal constituents. The metals contained in these formulations will potentially volatilize during incineration (i.e., the metals are non-embedded).

2.2.1.8.5. The quantity of each metal identified in Table 2-C-2 has been incorporated into Tables 2-B-1 and 2-B-2 found in Appendix B which present the total non-embedded metals for each munition and bulk container type to be treated at the TOCDF.

2.2.1.9. ECR Maintenance Residues

2.2.1.9.1. Maintenance performed on the demilitarization machines, Agent Quantification System (AQS) components, and Agent Collection System (ACS) components that are located in the Explosive Containment Rooms (ECR) will generate waste residues. Dry residues and sludge shall be placed into paper buckets prior to being fed to the DFS. A list of the ECR Maintenance Residues is provided in Table 2-2a.

TABLE 2-2a: Contaminated Waste	
ECR Maintenance Residues Waste Stream	**Allowable Waste Codes(s)**

TABLE 2-2a: Contaminated Waste	
ECR Maintenance Residues Waste Stream	**Allowable Waste Codes(s)**
• Filter elements and bags • Munition fragments (metal and explosives) • Dust, dirt, debris, ECR sump sludge • Munition components/fragments (i.e., burster fragments, supplementary charges, spacers, support cups, lifting lugs, and fuze adaptors that fall onto the turntable or floor) • Clean-up material (e.g., rags, absorbent pads) • Cotton goods (e.g., coveralls, mop heads) • ECR Sump strainers • Unserviceable hand tools and metal hardware (e.g., nuts, bolts, washers) • Burlap bags	P999, F999, D002, D003, D004, D005, D006, D007, D008, D009, D010

2.2.1.9.2 The Permittee shall decontaminate the unserviceable hand tools and metal hardware identified in Table 2-2a and process them in the MPF. If the explosive residue remains on the tools after decontamination, the metal tools and hardware shall be processed in the DFS. The maintenance residues in Table 2-2a may be contaminated with small amounts of spent decontamination solution, agent, hydraulic fluid, or lubricating fluid. Explosives-contaminated rags generated by personnel wiping explosive residues from reject munitions in the UPMC or ECV shall be fed to the DFS.

2.2.1.9.3 ECR maintenance residues shall be weighed and properly identified as to the origin and physical characteristics prior to incineration to ensure the DFS feed rate limits are not exceeded.

2.2.1.9.4 ECR maintenance residues are typically discarded items having agent surface contamination, explosive surface contamination, or both. Operation of equipment in the ECRs can generate explosive powders. ECR maintenance residues composed of powdered explosive and munitions components shall be managed separately from other ECR maintenance residues. The feed rate of ECR maintenance residues composed of explosive powders and munition components shall be limited to 3.6 pounds per drop with an internal kiln spacing of one flight between successive drops. The hourly feed rate is specified in Modules V (Long-Term Incineration) and VI (Short-Term Incineration).

2.2.1.9.5 ECR maintenance wastes charged to the DFS that do not contain explosive components or containers of explosive powder may be fed at the feed rates specified in Module V.. When 155mm mustard projectile bursters are not sheared, no significant explosive contamination of the ECR will occur from processing. Otherwise, when bursters have been sheared, then the ECR maintenance waste charged to the DFS are assumed to consist entirely of explosives.

2.2.1.10. Spent Activated Carbon

2.2.1.10.1 Prior to completion of closure of the TOCDF, the Permittee shall treat agent contaminated site-generated carbon using Autoclave technology. The effectiveness of Autoclave technology for treating agent-contaminated carbon shall be made in a separate function test.

2.2.1.10.2 The Permittee shall submit a function test to demonstrate the effectiveness of Autoclave technology for the treatment of agent-contaminated carbon that includes an analytical method to determine the amount of agent absorbed onto the carbon. Upon approval of the test plan and associated carbon analytical method by Executive Secretary, the Permittee may execute the plan per the requirements of Module VIII.

2.2.1.10.1.Prior to completion of closure of the TOCDF, the Permittee shall treat all site-generated carbon in the Carbon Micronization System (CMS). Prior to treatment in the CMS, a successful performance test shall be conducted based on an approved test plan.

2.2.1.10.2.2.2.1.10.3 The spent carbon shall be placed into permitted storage areas designated to store waste contaminated with the same type of chemical agent until the results of a function performance test are approved by the Executive Secretary.

2.2.1.10.4 PPE respirator carbon canisters and ACAMS filter canisters may be processed in the MPF per the specified feed rates in Table V.C.1. or in the Autoclave upon approval by the Executive Secretary of results of the testing specified in Module VIII.

2.2.1.10.3.

2.2.1.11. Agent Contaminated Dunnage

2.2.1.11.1. Dunnage meeting the following definition shall be characterized as P999 hazardous waste. Agent contaminated dunnage is defined as:

2.2.1.11.1.1. All dunnage held within an ONC or munitions overpack that is found to contain leaking munition(s) as evident by agent monitoring results of the air within the sealed ONC or overpack having a concentration of 0.5 VSL or above, or

2.2.1.11.1.2. Dunnage that contacted leaking munitions or is contaminated with liquid agent, or

2.2.1.11.1.3. Dunnage that has been sampled and the analytical results of an extract prepared from a representative sample have been found to contain agent at concentrations equal to or greater than 20 ppb for GB and VX, and 200 ppb of Mustard (H/HD/HT.)

2.2.1.11.2. Dunnage characterized as P999 hazardous waste shall be treated in the MPF or Autoclave based on approval of the Executive Secretary upon completion of a successful performance test in accordance with an approved test plan.

2.2.1.11.3. Reserved.

2.2.1.11.4. Within 180 days of the effective date of this Permit, the Permittee shall submit a performance test plan for dunnage management, which is sufficient to support completion of the treatment and disposal of dunnage waste streams.Reserved

2.2.1.11.5. Dunnage associated with M55 rockets will additionally be analyzed for PCBs to demonstrate that contact with PCB-regulated items (i.e., the M55 rocket shipping/firing tubes) did not cause cross-contamination of the dunnage.

2.2.1.11.6. The dunnage shall be placed into permitted storage areas designated to store waste contaminated with the same type of chemical agent until results of the test are a dunnage management plan is approved by the Executive Secretary.

2.2.1.12. Combustible Bulk Solid Secondary Waste Category

2.2.1.12.1. Upon successful completion of the Secondary Waste Demonstration Test, wastes included in this category may be processed in the MPF. Wastes included in this category evolve combustion gases, and generate ash residues when incinerated. Examples of these wastes are Demilitarization Protective Ensemble (DPE) suits, and butyl rubber components.

2.2.1.12.2. TOCDF will either analyze a representative sample of these wastes or use generator knowledge to determine proper feed rates. If generator knowledge is used, it will be documented in the operating record.

2.2.1.12.3. Each waste feed charge shall be weighed prior to incineration to ensure TOCDF Permit conditions are not exceeded. The TOCDF operating record shall include an entry for each WIC of waste fed to the MPF. Each of these entries will include a description of the waste, the weight of the waste, metals content (the concentration if applicable), and the basis for categorizing the waste as a Combustible Bulk Solid.

2.2.1.12.4 ~~2.2.1.12.4~~ Combustible Bulk Solid Wastes may be fed in the same WIC as other secondary waste categories provided all conditions of this attachment and Modules V and VI are met.

2.2.1.12.5 Additionally, these wastes included in this category may be processed in the Autoclave (Igloo 1631) provided an approved function test has been demonstrated and approved by the Executive Secretary.

2.2.1.12.6 For Autoclave processing, the TOCDF operating record shall include an entry for each secondary waste drum processed in the Autoclave. Each of these entries will include a description of the waste, type of container, the total weight waste, the volume of the container storing the waste, the hazardous waste label number, and the time and date the waste was processed in the Autoclave Module VIII.

~~2.2.1.12.7~~

2.2.1.13. Personal Protective Equipment (PPE) Respirator and ACAMS Carbon Filter Canisters

2.2.1.13.1. Three types of PPE respirator canisters are used at the TOCDF to prevent the inhalation of chemical agent (pre-1993 M-40, post-1993 M-40 and DPE backpack). Two types of ACAMS activated-carbon filter canisters are used to control agent emissions from ACAMS sample line exhaust (aluminum housing and plastic housing). The respirator canisters are filled with approximately five ounces of carbon that is impregnated with copper, zinc, silver, and molybdenum, the approximate weight percent of each being: six, six, one one-hundredth, and three respectively.

2.2.1.13.2. PPE respirator carbon filter canisters generated in areas where the user is exposed to chemical agent vapors at concentrations at or above the STEL are considered contaminated with chemical agent.

2.2.1.13.3 ~~2.2.1.13.3~~ The number of PPE or ACAMS carbon canisters added to each WIC and the material used to fabricate the outer shell of the canisters (PVC or aluminum) shall be noted in the operating record. The weights of carbon canisters shall be subtracted from the allowable weight of the secondary waste categories it is associated with e.g., PVC (combustible), aluminum (non-combustible), and carbon (metals/ash etc.)

2.2.1.13.4 Additionally, these wastes included in this category may be processed in the Autoclave (Igloo 1631) provided an approved function test has been demonstrated and approved by the Executive Secretary.

2.2.1.13.5 For Autoclave processing, the TOCDF operating record shall include an entry for each secondary waste drum processed in the Autoclave. Each of these entries will include a description of the waste, type of container, the total weight waste, the volume of the container storing the waste, the hazardous waste label number, and the time and date the waste was processed in the Autoclave per Module VIII.

2.2.1.14. Reserved

2.2.1.15. Miscellaneous Agent-Contaminated and Non-Agent-Contaminated Liquid Wastes

2.2.1.15.1. Agent-contaminated hydraulic fluid and lubricating oil generated in the MDB shall be either containerized and placed into permitted storage or containerized and transferred to the ACS tanks (e.g., via BDS) and subsequently treated in the LIC primary chambers. Before transfer to the ACS tanks, the container(s) shall be weighed (e.g., via BDS load cells or a calibrated scale in the TMA) and the contents shall be sampled and analyzed (ref: Table 2-0). The corresponding results shall be documented in the Operating Record. (Agent-contaminated shall be defined as being at or above 20 ppb for GB and VX, and 200 ppb for Mustard.

2.2.1.15.2. Agent-contaminated hydraulic fluid and lubricating oil may also be pumped to the ACS tanks, via the SDS collection system, and processed in the LIC primary chambers. A sample shall be collected from the spent decontamination tank before it is transferred to the ACS tank (ref: Table 2-0) for analysis.

2.2.1.15.3. Before treatment in the LICs, the samples described above shall be analyzed for HRA metals. The analytical results shall be used to ensure that LIC metal feed rate limitations are not exceeded. Additionally, the associated manufacturer information (e.g., MSDSs, product data sheets, etc.) shall be reviewed to identify organic hazardous constituents having a heat of combustion less than tetrachloroethylene (i.e., 2,141 BTU/lb). If any of these organic hazardous constituents are present, the waste shall be placed into permitted storage until an appropriate management option is identified by the Permittee and approved by the Executive Secretary. The results of the above analyses shall be documented in the Operating Record.

2.2.1.15.4. Non-agent contaminated hydraulic fluid and lubricating oil generated in the MDB shall be containerized and managed properly or transferred to the ACS tanks (e.g., via BDS) and subsequently treated in the LIC primary chambers. Before transfer to the ACS tanks, the container(s) shall be weighed (e.g., via BDS load cells or a calibrated scale in the TMA) and the contents shall be sampled and analyzed (ref: Table 2-0). The corresponding results shall be documented in the Operating Record.

2.2.1.15.5. Non-agent-contaminated hydraulic fluid and lubricating oil may also be pumped to the ACS tanks, via the SDS collection system, and processed in the LIC primary chambers. A sample shall be collected from the spent decontamination tank before it is transferred to the ACS tank (ref: Table 2-0) for analysis.

2.2.1.16. Reserved

2.2.1.17 Reserved

2.2.1.18 Secondary Waste Management

2.2.1.18.1 Each MPF charge interval and weight shall meet the limits for agent, halogens, ash, metals and BTU.

2.2.1.18.2 Noncombustible form core sandwich panels make up the outer walls of the MDB and concrete rubble generated during closure are not allowed to be processed until process for new waste streams from Module VI is followed and approved by the Executive Secretary.

2.2.1.18.3 Wastes containing metals must meet the requirements per Table V.C.1. by waste analysis if a sample can be obtained or by engineering evaluation based on manufacture literature. Manufacture information will be documented in the operating record.

2.2.1.18.4 Secondary wastes are in process once placed on a WIC, provided the WIC is located in the Lower Buffer Storage Area or the TMA A/B Area.

2.2.1.19 Agent Contaminated Sludge/Aqueous Wastes*

2.2.1.19.1 Waste is classified as sludge when it cannot be managed by the LIC system because of the inability to transfer to the ACS tanks. Sludge is generated from the maintenance of the ACS, AQS and SDS equipment maintenance and is managed separately from other secondary waste. Sludge is fed alone on a WIC. Sludge will be spread across the bottom of the WIC/container with a uniform thickness of less than 1.5 inches and verified prior to feeding into the MPF. Aqueous Waste* shall be fed to the MPF in 5-gallon container with fusible spout.

2.2.1.19.2 A representative sample of sludge shall be collected and analyzed prior to treatment in the MPF. The samples will be analyzed for HRA metals. Sampling and analysis is required for each WIC of sludge treated in the MPF.

2.2.1.19.3 Aqueous Wastes* are generated from the residue of the decontaminated drums of secondary waste and can either be processed through the LIC or processed in the MPF. If processed in the MPF, Aqueous Wastes shall be containerized and the containerized waste shall not be fed with other wastes on the WIC. The waste analysis requirements specified in Paragraph 2.2.1.19.2 shall be applicable to containerized Aqueous Waste treated in the MPF. The Aqueous feed rate shall not exceed the waste feed rate equivalent to the sludge feed rate.

2.2.1.20. Autoclave Secondary Waste Management

2.2.1.20.1. The secondary waste matrices contaminated with Agents VX, GB, or Mustard that are listed in Condition VIII.D.7.vi may be treated in the Autoclave upon approval of the Executive Secretary.

2.2.2. **Analyses for Wastes Requiring Off-Site Treatment & Disposal**

2.2.2.1. The waste streams included in this section shall be transported off site for further treatment and ultimate disposal. The analytical parameters were selected based on process knowledge, TOCDF analytical data, and Land Disposal Restriction Notification requirements. The extraction method that will be used to determine Toxicity Characteristic parameter concentrations will be the Toxicity Characteristic Leaching Procedure (SW-846 Method 1311).

2.2.2.1.1. All waste streams included in this section (with the exception of the dunnage generated in the UPA, treated scrap metal, and liquids generated in SUMP 110) shall be characterized as F999 hazardous waste. Treated scrap metal is defined as metal from bulk containers, projectiles, and mortar rounds which has undergone thermal decontamination in the MPF under normal operating parameters and has no residue remaining internally or externally on the scrap metal. Treated scrap metal shall be managed in accordance with Section 2.2.2.7.6 of this attachment after approval from the Executive Secretary for each agent campaign. Each shipment of F999 waste transported off site shall be accompanied by a hazardous waste manifest.

2.2.2.1.2. The Permittee shall determine the hazardous constituents in the waste streams to be treated off site. The Permittee shall also determine the underlying hazardous constituents as applicable in 40 CFR 268.9 and give proper notification with the hazardous waste manifest.

2.2.2.2. LIC Slag

2.2.2.2.1. The incineration of chemical agent and spent decontamination solutions in the LICs cause the generation of a “glass like” slag waste stream. Slag (in a molten state) accumulates in the secondary chambers of the LICs.

2.2.2.2.2. Each batch of slag shall be removed by tapping the slag extension of the secondary chamber and draining the molten slag into insulated drums or by chipping the solidified slag and placing the slag into containers. Each LIC secondary chamber is equipped with a view port that allows the operator to visually determine the slag level within the secondary chamber. The slag shall be removed before the slag level reaches the top of the view port.

2.2.2.2.3. Each batch of LIC slag generated shall be analyzed for TCLP metals after each re-bricking until the metal concentrations drop below the regulatory limits.

2.2.2.3. Reserved

2.2.2.4. Treated Burster Casings/Fuse Bodies/Ash

2.2.2.4.1 During the 155mm mustard projectile campaigns, residues collected at the DFS HDC output will consist of ash, empty burster casingsnose closures/lifing lugs and fuze well cups. The bursters are removed in the ECRs leaving the projectile's burster well intact and the projectile's agent cavity unopened. Projectile agent cavities are opened in the Munition Processing Bay (MPB) just prior to the agent draining process step.

2.2.2.4.2 The ash and debris generated from this waste stream shall be analyzed for agent concentration, TCLP metals, TCLP organics and Universal Treatment Standard (UTS) as required.

2.2.2.5 Reserved

2.2.2.6 DFS Cyclone Residues

2.2.2.6.1 DFS cyclone residues shall be analyzed per Table 2-1 for the parameters of chemical agent concentration, TCLP metals, and TCLP organics. If analytical results demonstrate this waste to be Toxicity Characteristic for organics, this waste stream shall additionally be analyzed for dioxins/furans and explosives.

2.2.2.6.2 Reserved

2.2.2.6.3 DFS cyclone residues having a chemical agent concentration below 20 parts per billion (ppb) for GB and VX, and 200 ppb for Mustard, shall be transported to an off-site Subtitle C TSDF.

2.2.2.6.4 DFS cyclone residues having an agent concentration equal to or greater than 20 ppb for GB and VX, and 200 ppb for Mustard shall be placed into permitted container storage until a treatment method is approved by the Executive Secretary.

2.2.2.7 Treated Bulk Containers/Projectiles/Mortar Rounds (Scrap Metal)

2.2.2.7.1 Each burn tray exiting the MPF undergoes an agent assessment to ensure adequate thermal treatment. The presence of chemical agent is determined by an Automatic Continuous Air Monitoring System (ACAMS) located at the MPF discharge airlock. If chemical agent is detected above 0.5 VSL, the munitions/bulk containers are moved back into the MPF to undergo further thermal treatment. Munitions/bulk containers will be processed through the discharge airlock in accordance with Module V, VI, and Attachment 22 using either high temperature or low temperature monitoring of the discharge airlock.

2.2.2.7.2 The MPF is designed with double-door airlock systems located on both the charge and discharge end of the primary combustion chamber (PCC). These systems prevent PCC combustion gases and agent vapors from being discharged to the MDB or the atmosphere when burn trays are charged and discharged respectively.

2.2.2.7.3 The MPF primary combustion chamber is divided into three zones. Treatment through the MPF requires that each burn tray charge remain in each zone for a preset period of time as specified in Module V. When a burn tray advances to the discharge airlock, one zone must remain empty while the ACAMS in the discharge airlock is used to monitor the treated munition(s).

2.2.2.7.4 While in the discharge air lock, the contents of the burn tray are monitored for the presence of chemical agents using ACAMS. The burn tray remains in the MPF discharge airlock for the ACAMS to monitor two complete cycles.

2.2.2.7.5 If chemical agent is detected at or above the action level of 0.5 VSL, the burn tray in the MPF discharge airlock is moved back into Zone 3 (or Zone 2 if the MPF is in a two-zone operation) for additional processing. If no agent is detected, the burn tray exits the MPF discharge airlock by being advanced to the MPF cool-down conveyor. Flaming or smoking munitions/bulk containers or waste trays shall be placed back into the discharge airlock for additional processing.

2.2.2.7.6 F999 scrap metal (i.e., “disposable scrap metal”) shall be managed as a hazardous waste and disposed at an approved, off-site Subtitle C TSDF unless the scrap metal is destined for recycling by smelting (i.e., “recyclable scrap metal”) per 2.2.2.7.7 below. Before disposal of the scrap metal, residue in the interior and on the exterior of the scrap metal shall be removed (e.g., vacuumed) and the scrap metal shall be visually verified as clean. The residue removed from disposable scrap metal shall be analyzed and managed according to the requirements described for MPF Munitions and Ton Container Residues (ref: section 2.2.2.10). The residue removed from recyclable scrap metal shall be analyzed and managed as described in 2.2.2.7.7 below.

2.2.2.7.7 For scrap metal destined for recycling exclusively by smelting, the recyclable scrap metal shall be managed as F999 disposable scrap metal hazardous waste and be transported with a hazardous waste manifest describing waste as an F999 Utah listed hazardous waste until 1) a test plan and report for the scrap metal has been approved by the Executive Secretary, and 2) verification testing has been accepted. Before shipment of recyclable scrap metal offsite, residue in the interior and on the exterior of the scrap metal shall be removed (e.g., vacuumed) and the scrap metal shall be visually verified as clean. The residue removed shall be analyzed and managed according to the requirements described below for the MPF Burn Tray, WIC and CTC residues (ref: section 2.2.2.9). Any MPF treated bulk container/projectile/mortar that contains residue that cannot be removed shall be considered a F999 hazardous waste (not recyclable scrap metal) and the requirements specified in paragraph 2.2.2.7.6 shall be followed. All mustard 155mm projectiles shall be managed per paragraph 2.2.2.7.6.

2.2.2.7.8 Mustard 155mm projectile residue for the initial and on-going verification sampling will be sampled and analyzed per Table 2-1 in this Attachment.

2.2.2.8 MPF Treated Debris

2.2.2.8.1 Pre-filters, HEPA filters, carbon filter trays (from which the carbon was removed prior to treatment in the MPF), munition overpacks, shipping containers, process equipment, and tools are treated in the MPF to remove surface contamination.

2.2.2.8.2 Each burn tray, WIC or CTC exiting the MPF is analyzed for chemical agent as described in Attachment 2 (Waste Analysis Plan) and Attachment 22 (Agent Monitoring Plan).

2.2.8.3 This MPF treated debris waste stream shall be managed separately from the scrap metal waste stream and shall not be recycled, with the exception of the following miscellaneous metal wastes; munition overpacks, piping, conveyors, drain probes, and shear blades. Miscellaneous metal wastes may be treated as scrap metal and recycled in accordance with paragraphs 2.2.2.7.6 and 2.2.2.7.7.

2.2.2.9 MPF Burn Tray, WIC and Cutaway Ton Container Residues

2.2.2.9.1 An inspection of the residue will be performed per criteria approved by the Executive Secretary. If the inspection criterion is met demonstrating complete treatment, then the waste will be sampled and analyzed, if required, and managed off-site. If the residue does not meet the criteria, the residue will be drummed and placed in storage for further processing. The MPF residues generated shall be analyzed due to the variability of the waste steams. Additional sampling is necessary to ensure compliance with the 40 CFR 268.7 to identify underlying hazardous constituents that may be present in the residue that could prevent land disposal.

2.2.2.9.2 Each shipping container (i.e., drum or roll-off, which ever is used) generated will be sampled. The samples will be screen for the agents contaminating the wastes. To determine applicable Toxicity Characteristics, samples will be additionally analyzed for TCLP metals and organic. To determine the presence of underlying hazardous constituents, samples will also be analyzed for metals as specified in Table 2-4a (note Toxicity Characteristic metals are a subset of this list), total volatile organic as specified in Table 2-4b, and total semi-volatile organics as specified in 2-4c. The volatile and semi-volatile organic analytes specified in Tables 2-4b and 2-4c were selected base on their potential to be present in the residue as products of incomplete combustion.

2.2.2.9.3. The residue waste stream resulting from the MPF incineration treatment of secondary waste shall be managed separately from the munitions metal residues and shall not be recycled. This waste stream shall be shipped to an approved hazardous waste facility for disposal.

2.2.2.10 MPF Munitions and Ton Container Residues

2.2.2.10.1 MPF munitions and ton container residues will be composed primarily of incinerated paint flakes and residues removed from the interior and exterior of the munition and ton containers as well as their burn trays. Residues shall be removed from each ton container or munition and associated burn trays and managed as hazardous waste separately from munition/ton container.

2.2.2.10.1.1 MPF munitions and ton container residues shall be analyzed for chemical agent concentrations, HRA metals, TCLP metals and TCLP organics.

2.2.2.10.2 Residue generated from the processing of ton containers and munitions shall be sampled and analyzed per Table 2-1. The sampling frequency may be extended to quarterly if supporting information is submitted and approved by the Executive Secretary that demonstrates the consistency of the analytical results relative to the hazardous waste codes applied to this waste stream.

2.2.2.10.3 The agent cavities of the mustard 155mm projectiles are obstructed by the burster well which prevents access to the projectiles' interior surfaces. The interior of the projectile will not be cleaned out prior to disposal at an approved hazardous waste facility.

2.2.2.11 Incinerator Refractory

2.2.2.11.1 Upon change out, the discarded refractory lining of the incinerator primary and secondary chambers shall be analyzed for TCLP metals and properly managed.

2.2.2.12 PAS Residues

2.2.2.12.1 PAS residues are comprised of scrubber brine precipitate and filter elements. The precipitate is collected in the bottom of the PAS process vessels (i.e., the quench towers, packed bed scrubbers, and demister vessels), and the PAS brine filters.

2.2.2.12.2 Reserved

2.2.2.12.3 The PAS residues shall be analyzed for the parameters of chemical agent concentration, corrosivity (pH), free liquids, TCLP metals, and TCLP organics.

2.2.2.13 Spent Scrubber Brines

2.2.2.13.1 Scrubber brines are removed from the PAS as they are generated by the process control equipment. Spent scrubber brines shall be stored in BRA-TANK-101, BRA-TANK-102, BRA-TANK-201, and BRA-TANK-202.

2.2.2.13.2 The scrubber brines are shipped to an off-site TSDF for further treatment as necessary and ultimate disposal.

2.2.2.13.3 Spent scrubber brines from each BRA tank to be transferred off site for further treatment and ultimate disposal shall be analyzed for chemical agent concentration, corrosivity (pH) and specific gravity.

2.2.2.13.4 On a monthly basis or each munitions campaign change, whichever is sooner, a composite sample comprised of a sample from each BRA Tank shall be analyzed for TCLP metals and TCLP organics. This analysis is to confirm the current waste profile for scrubber brines. The brine from which the confirmatory sample was taken may be shipped off site under the current brine waste profile.

2.2.2.13.5 For Subpart CC VOC demonstration compliance, spent scrubber brines shall be sampled as the tank is being filled as required in Table 2-1 and specified by Section 2.10.

2.2.2.13.6 Spent scrubber brines shall only be shipped off site for further treatment and ultimate disposal if the agent concentration in the brines is below 20 ppb for GB and VX, and 200 ppb for Mustard.

2.2.2.13.7 Reserved.

2.2.2.13.8 MPF brine samples shall be collected and analyzed after the initial agent verification sampling the furnace is completed and trays are fed back to back, but no longer than 4 weeks after commencement of the mustard 155mm projectile campaign. Brine samples shall be collected from the discharge of the on-line MPF PAS brine pump. The samples shall be collected weekly, within the last four hours of the 12-hour day shift, and before any manual adjustment is made to MPF PAS liquid levels (excluding adjustments required addressing contingencies.) The samples shall be collected weekly until approval of the Executive Secretary to discontinue this sampling frequency has been granted. The samples shall be analyzed for HRA metals.

2.2.2.14 SDS Tank Sludges

2.2.2.14.1 Filters associated with the SDS tanks collect solids that have precipitated out of spent decontamination solution. The sludge removed from the filters associated with the SDS tanks shall be analyzed for chemical agent, corrosivity (pH), free liquids, explosives, TCLP metals, and TCLP organics.

2.2.2.14.2 SDS tank sludges shall only be shipped off site for further treatment and ultimate disposal if the agent concentration in the sludges is below 20 ppb for GB and VX, and 200 ppb for Mustard. If the agent concentration is found to be greater than or equal to these values, decontamination solution shall be added to the accumulation container and the analysis for chemical agent, pH, and free liquids shall be repeated.

2.2.2.14.3 Sludges from SDS sumps located outside of the ECRs shall be managed in accordance with Paragraphs 2.2.2.14.1 and 2.2.2.14.2.

2.2.2.15 BRA Tank Sludges

2.2.2.15.1 Between agent campaigns, the scrubber brine sludge which has collected in the BRA tanks is removed. During scheduled maintenance of a BRA tank, scrubber brine sludge may be removed.

2.2.2.15.2 BRA tank sludges shall be analyzed for agent concentration, pH, free liquids, TCLP metals, and TCLP organics.

2.2.2.16 PAS Demister Candle Sleeves

2.2.2.16.1 Prior to shipment, the demister candle sleeves from each PAS shall be analyzed for chemical agent concentration, TCLP metals and TCLP organics.

2.2.2.17 Reserved

2.2.2.18 Reserved

2.2.2.19 Reserved

2.2.2.20 Dunnage Generated in the Unpack Area (UPA)

2.2.2.20.1 The initial waste characterization of dunnage received in the UPA is based on a determination by Area 10 personnel.

2.2.2.20.2 UPA personnel shall use ONC/overpack agent monitoring to determine if dunnage has become contaminated during transport to TOCDF. Dunnage present in ONCs/overpacks having agent monitoring results of 0.5 VSL or greater shall be characterized as P999 hazardous waste and managed as specified in paragraph 2.2.1.11.2.

2.2.2.20.3 Samples of dunnage (that have not been declared hazardous waste by Area 10) shall be taken in accordance with Table 2-1 from ONCs/overpacks that monitor below 0.5 VSL and do not contain leaking munitions. If an analysis of representative samples of dunnage shows agent concentrations at or above the WCL, the dunnage shall be characterized as P999 hazardous waste and managed as specified in paragraph 2.2.1.11.2. If the agent analytical results show the agent concentration is below the WCL and exhibits no hazardous waste characteristics or listings, the dunnage is not considered a listed hazardous waste.

2.2.2.21 DPE Suits

2.2.2.21.1 Demilitarization Protective Ensemble (DPE) suits are encapsulating supplied air PPE worn by personnel required to enter areas in the MDB where agent liquid or vapors are known to exist. DPE suits are made of a mixture of PVC, chlorinated polyethylene resins, plasticizers, and metal stabilizers, as opposed to the Army Level A Suits that are made of butyl rubber. Each suit is decontaminated before the “Entrant” is removed from the suit. The decontaminated suits are bagged in containers (typically plastic bags, with two to three suits per bag).

2.2.2.21.2 Discarded DPE Suits shall be characterized as P999, F999, or a combination of P999/F999 hazardous waste.

2.2.2.21.3 DPE Suits that are not monitored for agent shall be characterized as P999 hazardous waste and managed as specified in paragraph 2.2.2.21.8.

2.2.2.21.4 Reserved.

2.2.2.21.5 DPE Suits may be characterized as P999/F999 hazardous waste based upon and agent monitoring results of less than1.0VSL and will be managed in accordance with paragraph 2.2.2.21.10.

2.2.2.21.6 Containers of DPE suits having agent-monitoring results equal to or greater than 1.0 VSL shall be characterized as P999 hazardous waste and managed as specified in paragraph 2.2.2.21.8

2.2.2.21.7 Reserved.

2.2.2.21.8 DPE suits to be managed as a P999 listed hazardous waste shall be treated in the MPF based on the results of the MPF Secondary Waste Demonstration Test. The treated DPE suit residue shall be managed off site as an F999 hazardous waste in accordance with condition 2.2.2.9.

2.2.2.21.9 Reserved.

2.2.2.21.10 DPE suits shipped off site as F999/P999 hazardous waste shall be managed at a Subtitle C TSDF. F999/P999 waste that is greater than 0.2 VSL and less than 1.0 VSL will require off-site controls (through contract requirements) as an added measure of control to reduce potential contact with the waste.

2.2.2.22 Spent Non-Agent Contaminated MDB Equipment Hydraulic Fluid and Lubricating Oil

2.2.2.22.1 Spent hydraulic fluid and lubricating oil generated in the MDB to be transported off site for treatment shall be analyzed for chemical agent concentration, HRA metals, and TCLP organics.

2.2.2.22.2 MDB-generated spent hydraulic fluid and lubricating oil having agent concentrations less than 20 ppb for GB and VX, and 200 ppb for Mustard may be managed at an off-site Subtitle C TSDF or treated in the primary chamber of one of the LICs in accordance with Section 2.2.1.15.

2.2.2.22.3 MDB-generated spent hydraulic fluid and lubricating oil contaminated with chemical agent at or above 20 ppb for GB and VX, and 200 ppb for Mustard, shall be managed in accordance with Section 2.2.1.15.

2.2.2.22.4 The failure of a mechanical system inside the MDB could result in the generation of fluids contaminated with chemical agent and be commingled with spent decontamination solution. These fluids shall be collected in sumps and transferred to SDS-TANK-101, SDS-TANK-102 or SDS-TANK-103 and managed as described in Section 2.2.1.4 or 2.2.2.28.

2.2.2.22.5 Rags and absorbent materials from cleanup of hydraulic fluid and lubricating oil spills shall be characterized and managed appropriately.

2.2.2.23 Reserved

2.2.2.24 CAL Aqueous Wastes

2.2.2.24.1 Operation of analytical equipment within the CAL results in the generation of an aqueous waste stream.

2.2.2.24.2 CAL aqueous waste shall be analyzed for agent concentration, corrosivity (pH), ignitability, TCLP metals, and TCLP organics.

2.2.2.24.3 CAL aqueous wastes may be transported off site for further treatment and ultimate disposal at a Subtitle C TSDF only if the agent concentration in the waste is below 20 ppb for agents GB and VX, and 200 ppb for agent Mustard.

2.2.2.25 CAL Solid Wastes (debris)

2.2.2.25.1 CAL generated solid wastes consist of but are not limited to discarded glassware, wipe cloths, paper, PPE, plastic, wood, pipet tips, DAAMS tubes, transfer tubes, silver-fluoride pads, discarded analytical equipment components, and vermiculite.

2.2.2.25.2 Each individual item comprising this waste stream is decontaminated before it is placed into the accumulation container. Over time as the container is filled, decontamination solution residues (that once clung to the item) collect in the bottom of the container. A sample of this residual decontamination solution shall be taken from the bottom of each container of CAL solid debris generated and analyzed for chemical agent.

2.2.2.25.3 Containers having analytical results demonstrating the agent concentration in the decontamination solution is below 20 ppb for GB and VX, and 200 ppb for Mustard, shall be classified as F999 listed hazardous wastes.

2.2.2.25.4 Containers having final analytical results demonstrating the agent concentration in the decontamination solution is at or above 20 ppb for GB and VX, and 200 ppb for Mustard shall be placed into permitted storage until the Executive Secretary approves a treatment plan.

2.2.2.26 MSB Solid Waste (debris)

2.2.2.26.1 MSB generated solid wastes consist of but are not limited to wipe cloths, PPE, discarded monitoring system components, tygon tubing, silver-fluoride pads, DAAMS tubes, pre-concentrator tubes, and discarded analytical equipment.

2.2.2.26.2 This waste stream shall be sampled, analyzed, and managed as described in paragraphs 2.2.2.25.2 through 2.2.2.25.4

2.2.2.27 Sump 110

2.2.2.27.1 Sump 110 is a collection sump designed to receive precipitation run-off collected on the incinerator PAS concrete pads. In the event of a PAS process equipment leak, the potential exists for Sump 110 to also accumulate incinerator PAS liquids/solids (e.g., scrubber brines). These liquids/solids generated from the treatment of chemical agents and chemical agent munitions are a listed hazardous waste in Utah.

2.2.2.27.2 If the material (either liquid or solids) accumulated in Sump 110 is to be transferred off site for treatment and/or disposal, a sample of the material shall be analyzed for agent concentration, pH, TCLP metals, and TCLP organics. If the agent concentration is below 20 ppb for GB or VX or below 200 ppb for Mustard, then the material may be transferred off site for treatment and/or disposal.

2.2.2.27.3 Unless the Permittee can demonstrate in accordance with R315-2-3(d) that the material removed from the sump is not a hazardous waste, the material shall be managed as a hazardous waste.

2.2.2.27.4 To determine if liquid collected in Sump 110 shall be treated on site or transferred off site for further treatment and disposal, the liquids shall be visually inspected for the presence or absence of a surface oil sheen. Sump 110 liquids having a surface oil sheen, which is evidence that organics were mixed with the sump contents, shall not be transferred to the BRA for on-site treatment.

2.2.2.27.5 When material accumulated in Sump 110 is transferred off site in tankers, the material in each tanker shall be sampled and analyzed for pH, TCLP metals and TCLP organics. The material shall also be analyzed to confirm that agent concentrations are at or below either 20 ppb for GB and VX, or 200 ppb for Mustard.

2.2.2.27.6 If no surface oil sheen is visually present on the liquid accumulated in Sump 110, the liquid may be transferred to one of the BRA-Tanks. Any solid material removed from the sump shall be managed as a hazardous waste.

2.2.2.27.7 Instead of off-site treatment/disposal, the liquid accumulated in Sump 110 may be transferred to one of the BRA-Tanks provided no surface oil sheen is visually present. Likewise, any solid material removed from the sump may be containerized and then stored and/or treated on site.

2.2.2.28 Autoclave Treated Waste

2.2.2.28.1 Each batch of waste treated in the Autoclave is subjected to a minimum temperature for minimum time-period. The final process step is to fill the previously evacuated Autoclave with ambient air. After a predetermined time to allow for mixing and evaporation of moisture from the treated waste, the interior of sealed Autoclave is monitored for agent.

2.2.2.28.2 If the agent monitoring result of the air within the Autoclave (i.e., the Autoclave headspace) are less than 0.5 VSL, the batch of treated waste is classified as F999 hazardous waste and may be managed in a roll-off for shipment to an off-site Subtitle C TSDF. The initial waste codes applicable to the wastes before treatment, other than the P999 waste codes, still apply after Autoclave treatment since the only waste constituent the Autoclave treats is the agent (i.e., other waste codes may apply).

2.2.2.28.3 If the agent monitoring results of the Autoclave headspace shows an agent concentration equal to greater than 0.5 VSL the batch of wastes undergo a newsecond treatment cycle in the Autoclave.

2.3 PARAMETER TEST METHODS R315-8-2.4 [40 CFR 264.13(b)(2)];

2.3.1 Table 2-3 provides a listing of the analytical methods that shall be used to detect and quantify the selected parameters. This information is presented in a relational format in Tables 2-0 and 2-1 (the WAP Summary Tables).

2.3.2 The on-site Chemical Assessment Laboratory (CAL) shall perform the analyses related to chemical agent and other CAL-assigned analyses listed in Tables 2-0 and 2-1.

2.3.3 The CAL shall be Utah-certified to perform analyses for the parameters that require Utah certification.

2.3.4 Off-site analyses shall be performed by a Utah-certified laboratory for the parameters listed in Table 2-3.

2.3.5 The off-site laboratories selected shall be certified by the State of Utah for the methods referenced in this waste analysis plan. When new promulgated methods are approved by EPA, the Permittee shall notify the off-site laboratories of the required change and request a time frame of when the change will occur. A laboratory will have six months to submit documentation to the Permittee of the change or a time frame when the change will be completed. The laboratory must use the most recently approved method within one year of promulgation. If that is not possible, a written request for extension must be provided to the Executive Secretary for approval. Only SW-846 promulgated methods shall be used unless an alternate method is approved by the Executive Secretary.

2.4 SAMPLING METHODS R315-50-6 [40 CFR 264.13(b)(3)];

2.4.1 The sampling methods to be used for each waste stream are found in Tables 2-0 and 2-1 (the WAP Summary Tables).

2.5 FREQUENCY OF ANALYSES R315-8-2.4 [40 CFR 264.13(b)(4)];

2.5.1 The frequencies at which each waste stream shall be sampled and analyzed are found in Tables 2-0 and 2-1 (The WAP Summary Tables).

2.6 ADDITIONAL REQUIREMENTS FOR WASTES GENERATED OFF SITE R315-8-2.4 [40 CFR 264.13(b)(5)];

2.6.1 The Permittee is not permitted to store or treat waste generated off site. The Permittee is only permitted to store and treat wastes generated by the facility having EPA ID Number UT5210090002.

2.7 ADDITIONAL REQUIREMENTS FOR IGNITABLE, REACTIVE, OR INCOMPATIBLE WASTES R315-8-2.8 [40 CFR 264.13(b)(6)];

2.7.1 The Permittee shall comply with R315-8-2.8 for management of ignitable, reactive, or incompatible wastes.

2.8 RECORDKEEPING REQUIREMENTS R315-8-5.3 [40 CFR 264.73(b)(3)];

2.8.1 In accordance with Module II.I, analytical results generated in compliance with Attachment 2 (Waste Analysis Plan) shall be maintained on file at the TOCDF as part of the Operating Record.

2.9 SAMPLING AND ANALYSIS QA/QC PROCEDURES

2.9.1 The Laboratory Quality Control Plan in Attachment 3 describes the Quality Assurance/Quality Control procedures established at the TOCDF to ensure integrity and accuracy of the waste sampling and analysis effort.

2.10 SUBPART CC AND BB SAMPLING AND ANALYTICAL PROCEDURES

2.10.1 The Permittee shall perform initial or change-of-process waste determinations for hazardous waste listed in Tables 2-0 and 2-1 for wastes managed in containers, primary containment sumps, and tanks identified in Table 2 entitled "Hazardous Waste/Permitted Hazardous Waste Management Units" and Table 4 entitled "Hazardous Waste Sump Systems". These determinations shall be made at the points of waste origination for average VOCs before the first time any portion of the waste stream is placed in an applicable container, primary containment sump, and tank system.

2.10.2 The average VOC is the mass-weighted average of a hazardous waste as made in accordance with Section 2.10.1. The Permittee may choose from the two following sets of requirements for waste determinations:

2.10.2.1 Direct measurements or methods specified in Table 2-3 or

2.10.2.2 Knowledge-based determinations.

2.10.3 Waste determinations for VOC through direct measurements shall document the point of waste origination and the average VOC for an averaging period. The averaging period for all waste streams shall be designated and documented in the Operating Record. The averaging period can represent any time interval that the Permittee determined is appropriate for each hazardous waste stream of this section, but shall not exceed one year.

2.10.4 Direct sample measurements shall be taken at the points of waste generation in manner to eliminate volatilization, biodegradation, reaction, or sorption during the sample collection storage and preparation steps. For ACS and SDS tank systems, the point of origination shall be considered the tank. A minimum of four samples shall be collected at the points of origination for applicable waste streams identified in this attachment. All samples for a given waste determination shall be collected within a one-hour period. The average of the four sample results constitutes a waste determination for the waste stream. All samples used for waste analysis shall be representative of the highest VOC.

2.10.5 All samples shall be collected and analyzed in accordance R315-7-30 [40 CFR 265.1084], Attachment 3 (Sampling, Analytical, and QA/QC Procedures), and this Attachment.

2.10.6 The Permittee may also apply other methods and requirements of R315-7-30 [40 CFR 265.1084(a)(3)] for samples collected and analyses to determine VOC, provided the methods are approved by the Executive Secretary as required by R315-3-4.

2.10.7 All direct measurements used for sampling and analytical results which require implementation of Module X and Section 2.10, Subpart CC waste analysis requirements shall be documented in the Operating Record and shall include the following:

2.10.7.1 Point of waste generation

2.10.7.2 Averaging period
2.10.7.3 Sampling plan used (See 40 CFR 265.1084(b)(3)(ii)(C))
2.10.7.4 Date, time, and location where the samples were collected (40 CFR 264.1089(f))
2.10.7.5 Quality assurance program including procedures to minimize loss of organics during sampling and measurement of accuracy of procedures (40 CFR 265.1084(a)(3)(iii)(F))
2.10.7.6 Analytical method used (40 CFR 264.13(b))
2.10.7.7 Identification of the analyst who performed the analytical tests, and Analytical operating conditions.

2.10.8 Knowledge-based determinations may be used for making waste determinations provided that there is sufficient information to meet the requirements found in R315-8-22 [40 CFR 265.1084(a)(4)].

2.10.9 The Permittee shall make and update all analytical determinations required by Section 2.10 annually or prior to an agent campaign change for waste streams identified in this Attachment.

2.10.10 For waste streams identified in Tables 2-0 and 2-1 that are determined during sampling to have VOC above 500 ppm and are not managed with air emission controls as required by R315-8-22 [40 CFR 264.1084 through 264.1087], the Permittee shall notify the Executive Secretary of each occurrence of non-compliance and prepare plans for the adoption of air emission control requirements or waste determinations as required by this section.

2.10.11 The maximum organic vapor pressure waste determinations shall be performed by either direct measurement or knowledge of the waste prior to the first time hazardous waste is placed in the tank unit. Waste determinations for tank systems listed on Table 2 entitled "Hazardous Waste/Permitted Hazardous Waste Management Units" shall be performed as specified by R315-8-22 [40 CFR 265.1084(c)] for tank systems using Level One control.

2.10.12 Direct measurements for maximum organic vapor pressure shall be one of the following:

2.10.12.1 Method 25E in 40 CFR 60, Appendix A;

2.10.12.2 ASTM Standard Test Method for Vapor Pressure, ASTM 2879-92 (40 CFR 260.11).

2.10.13 Knowledge of the waste for maximum organic vapor pressure shall be determined in accordance with Paragraph 2.10.11.

2.10.14 As indicated below, the following wastes and waste management units are exempt from certain Subpart CC and sampling and analytical requirements of this Section:

2.10.14.1 Hazardous waste that has been treated or reduced by an organic destruction or removal process that satisfies any one of the requirements and conditions of R315-8-22 [40 CFR 264.1082(c)] is not subject to waste analysis requirements of Section 2.10.

2.10.14.2 Hazardous waste and residues, which are to be managed in containers, sumps, and tanks, which are complying with the air emission control standards of R315-8-22 [40 CFR 264.1084 through 1087] are not subject to waste analysis requirements of Section 2.10.

2.10.14.3 Wastes which are collected subject to chemical events and discharges of wastes subject to spill clean-up requirements are not subject to the waste analysis requirements of Section 2.10.

2.10.14.4 The sumps and tank systems that must meet Level Two air emission control standards specified by R315-8-22 [40 CFR 264.1084(b)(2)] are not subject to maximum organic vapor pressure determinations of Section 2.10.

2.10.14.5 Wastes that satisfy the requirements specified in R315-8-22 [40 CFR 264.1082(c)(4)] are not subject to waste analysis requirements of Section 2.10.

2.10.15 The Permittee shall perform required waste analysis determinations for Subpart BB equipment identified in 40 CFR 264.1052 through 264.1062, that contains or contacts hazardous waste with organic concentrations that equal or exceed 10 percent by weight using the analytical methods listed in Table 2-0 and Table 2-1 by either direct measurement or by using knowledge-based determinations in Section 2.10.19.

2.10.16 Direct measurements shall be obtained by collecting Subpart BB samples and performing an analysis as specified by Section 2.10.5 to determine organic concentration levels for equipment.

2.10.17 All samples and analysis results required by Section 2.10.19.2 shall be documented in the Operating Record.

2.10.18 All analytical samples collected shall be representative of the highest total organic content of hazardous waste that contacts equipment.

2.10.19 Application of knowledge of the nature of the waste or the process may be used for waste determination for Subpart BB equipment provided that the Permittee documents the waste determination by one of the following procedures:

2.10.19.1 A demonstration that shows that no organics are used or are in contact with the equipment at a particular point in the process.

2.10.19.2 Direct measurement data for waste streams listed in Table 2-0 and 2-1 may be used for equipment in contact with an identical hazardous waste stream that contains a total organic concentration of less than 10 percent by weight. If direct measurement methods are used to supplement knowledge-based determination, the following shall be maintained:

2.10.19.2.1 The analytical method

2.10.19.2.2 Sampling procedures

2.10.19.2.3 Sample variability

2.10.19.2.4 Analytical variability associated with the test method that was used [40 CFR 265.1084(a)(4)]

2.10.19.2.5 Location of sample collection

2.10.19.2.6 Date and times samples were taken

2.10.19.3 If knowledge is to be used instead of the specified test method for a specific waste, then the following shall be documented in the Operating Record to support the knowledge-based determination:

2.10.19.3.1 Organic material balances of the source generating the waste or

2.10.19.3.2 Previous organic constituent test data or

2.10.19.3.3 Any other information, including but not limited to manifests, shipping papers, and waste certification notices.

2.10.20 Samples collected for leak detection monitoring requirements specified by Module X.C and X.D, shall be obtained to meet the performance standards of 40 CFR 60, Method 21. Monitoring requires that samples be taken in close proximity to the Subpart BB Equipment, and documented exceedance of Method 21. Sampling shall be performed in accordance with the frequencies established by Module X.C.

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	PREPARATION and ANALYTICAL METHODS[1,5,8]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
2.2.1.3. Chemical Agent (Initial Waste Profile)	LIC 1 LIC 2 MPF	Based on an Approved Agent Sampling and Analysis Plan.	Based on an Approved Agent Sampling and Analysis Plan	Prior to agent campaign, sampling/analysis requirements based on agent specific sampling plan.	Based on an Approved Sampling and Analysis Plan
		(Baseline Ton Containers Only) HRA Metals	 TE-LOP-584 and TE-LOP-557, or 3050, or 3051, or 3052 and 6010 or 6020 and 7470	During the Baseline Mustard TC campaign, one liquid sample analyzed from each TC stored at DCD, Area 10 prior to transfer to TOCDF	
		Mustard 155mm Projectiles Agent Purity (Liquid Only) Agent Organic Impurities (Liquids) HRA Metals (Liquid and Solid)	 TE-LOP-584 TE-LOP-584 Including TICs TE-LOP-584 and TE-LOP-557, or 3050, or 3051, or 3052 and 6010 or 6020 and 7470	Three Samples from each of the five lots specified below both liquid and solid matrices. (30 total sample analyses) EA-2-9 EA-2-4 EA-4-30 EA-4-33 EA-4-32 *The Unknown lot will be addressed at a later date prior to processing	Based on an Approved Sampling and Analysis Plan
		4.2 inch HT mortars Based on Approved Sampling and Analysis and Ramp-up Plans (Phases I, II, II)	 TE-LOP-584 TE-LOP-584 Including TICs TE-LOP-584 and TE-LOP-557	 To Be Determined	 Based on an approved Sampling and Analysis Plan.

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	PREPARATION and ANALYTICAL METHODS[1,5,8]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
2.2.1.3 Chemical Agent (Process Analysis)	LIC 1 LIC 2 MPF DFS	Agent Organic Content (Purity and Impurities) HRA Metals Density	TE-LOP-584 TE-LOP-584 and TE-LOP-557 or 3050, or 3051, or 3052 and 6010 or 6020 and 7470 and TE-LOP-584	During each agent campaign, one sample analyzed for each munitions/bulk item campaign or quarterly which ever is shorter	Tap or Remote Agent Sampling System if sample is collected from ACS-Tank-101 or 102 or Tap if collected from the Agent Quantification System or Pipette if agent sample is taken directly from munitions or bulk container
	ACS-TANK-101, 102	HRA Metals Agent Organic Content (Purity and Impurities) Density	TE-LOP-584 and TE-LOP-557, or 3050, or 3051, or 3052 and 6010 or 6020 and 7470 TE-LOP-584 TE-LOP-584	One representative sample from the ACS tank weekly of Baseline Mustard TC processing during the MPF shakedown period.	Tap or Remote Agent Sampling System if sample is collected from ACS-Tank-101 or 102 or Tap if collected from the Agent Quantification System
Chemical Agent (Process Verification Sample Analysis)	MPF	Mustard 155mm Projectiles Agent Purity (Liquid Only) Agent Organic Impurities (Liquid HRA Metals (Liquid and Solid)	 TE-LOP-584 TE-LOP-584 Including TICs TE-LOP-584 and TE-LOP-557, or 3050, or 3051, or 3052 and 6010 or 6020 and 7470	On sample from each of the following lots specified below for both the liquid and solid matrices. (30 total samples): EA-2-5* will be sampled towards the end of the campaign EA-2-7, EA-2-10, EA-4-2 EA-4-3, EA-4-4, EA-4-6 EA-4-7, EA-4-8, EA-4-9 EA-4-10, EA-4-14, EA-4-17 EA-4-34, EA-4-37	Based on an Approved Sampling and Analysis Plan

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	PREPARATION and ANALYTICAL METHODS[1,5,8]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
		Mustard 155mm Projectiles		One sample quarterly after the above lots have been sampled	Based on an Approved Sampling and Analysis Plan
		Agent Purity (Liquid Only)	TE-LOP-584		
		Agent Organic Impurities (Liquid and Solid)	TE-LOP-584 Including TICs		
		HRA Metals (Liquid and Solid)	TE-LOP-584 and TE-LOP-557, or 3050, or 3051, or 3052 and 6010 or 6020 and 7470		
		Chlorine (Liquid & Solid)	TE-LOP-584/9056		
	LIC 1 LIC 2	4.2 inch HT mortars			Tap
		HRA metals	TE-LOP-584 and TE-LOP-557	One weekly ASC tank sample	
		Agent Purity	TE-LOP-584	Every Fifth ASC tanks will also be analyzed for these parameters	
		Agent Organic Content	TE-LOP-584 Including TICs		
		Chlorine	TE-LOP-584/9056		

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	PREPARATION and ANALYTICAL METHODS[1,5,8]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
2.2.1.4 Spent Decontamination Solution[5]	LIC 1 and LIC 2 Secondary Chamber	Agent Concentration % Organics Corrosivity (pH) Specific Gravity	TE-LOP-572 TE-LOP-572 TE-LOP-574 (9040) TE-LOP-574	Each SDS-TANK prior to treatment	Tap
Spent Decontamination Solution Additional Analysis (Organic Content[5] > 5%)		Explosives (if processing explosive munitions) HRA Metals TCLP Organics[8]	3545/8330 and 8332 TE-LOP-557 or 3010 or 3015 or 3050, or 3051, and 6010 or 6020 and 7470 1311 and 5030 and 8260	Samples collected from the SDS tanks quarterly as a confirmatory analysis	
		Ignitability HRA Metals TCLP	1020 or 1010 3010 or 3015 or 3050, or 3051, and 6010 or 6020 and 7470 1311 and 5030 and 8260 and 3510 or 3520 and 8270	Each SDS-TANK having an organic content greater than 5% by weight	
2.2.1.5 Agent Collection System, Agent Quantification System and Spent Decontamination System Maintenance Residues[5]	MPF	Per requirements of 2.2.1.18.			
2.2.1.6. Noncombustible Bulk Solids	MPF or Autoclave	Generator knowledge and engineering evaluation	Wastes shall be weighed and thoroughly characterized prior to treatment in the MPF. For Autoclave treatment, see paragraph 2.2.1.6.6		
2.2.1.7 Drained Bulk Containers/and Undrained Mustard 155mm Projectiles with Agent Residue	MPF	Non-embedded metals (Appendix B) and generator knowledge based on analytical results obtained from line item 2.2.1.3			
2.2.1.8 Energetic Munitions Components	DFS	Manufacturer Specifications (Appendix C)			

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	PREPARATION and ANALYTICAL METHODS[1,5,8]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
2.2.1.9 ECR Maintenance Residues ECR Maintenance Residues (Projectile Processing) See Table 2-2a for list of wastes.	DFS	Generator knowledge based on analytical results obtained from line items 2.2.1.3 and 2.2.1.8.			
2.2.1.10 Spent Activated Carbon from MDB HVAC & ACS-TANK Filter Systems	Permitted storage until on-site treatment method is approved by the Executive Secretary				
2.2.1.11 Agent Contaminated Dunnage (TMA and UPA Generated)	Permitted storage until on-site treatment method is approved by the Executive Secretary			See Section 2.2.1.11	
2.2.1.12 Combustible Bulk Solids	MPF or Autoclave	Generator Knowledge and engineering evaluation when composition of waste prevents a representative sample from being taken. Treatment allowed based on worst case feed demonstrations performed during the MPF Secondary Waste Demonstration Test	Wastes shall be weighed and thoroughly characterized prior to treatment in the MPF For Autoclave treatment, see paragraph 2.2.1.12.5		
2.2.1.13 PPE Respirator Canisters and ACAMS carbon canisters	MPF	Generator knowledge and engineering evaluation			
2.2.1.14 DPE Suits	MPF	Agent Concentration (Air)	ACAMS TE-LOP-524/TE-LOP-522	Each bag of DPE suits having a agent monitoring result of greater than 1.0 VSL	Head-Space Monitoring

Table 2-0
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.1 WASTES REQUIRING ON-SITE TREATMENT

WASTE STREAM	TREATMENT UNIT(S)	ANALYTICAL PARAMETERS[5,7]	PREPARATION and ANALYTICAL METHODS[1,5,8]	FREQUENCY OF ANALYSIS[5] (Establish Profile)	SAMPLING METHOD[5]
2.2.1.15 Miscellaneous Agent Contaminated and Non-Agent Contaminated Liquid Wastes	LIC 1 and LIC 2 Primary Chamber	HRA Metals Review of manufacturer's information for all Properties) for organic constituents identified in Permit.	TE-LOP-557, 3050, or 3051, and 6010, or 6020 and 7470	Once for every batch[2]. Analysis to be completed prior to treatment.	Tap
2.2.1.16 Reserved					
2.2.1.18 Secondary Waste	MPF	HRA Metals, BTU s, Total Halogens, Ash Content Agent Concentration	TE-LOP-557, 3050, or 3051, and 6010 or 6020 and 7470 ASTM D 5865 or generator knowledge 9056 or generator knowledge ASTM D482 or generator knowledge TE-LOP-572, or generator knowledge	Each WIC fed with sludge	Thief, Scoop, Coliwasa.
2.2.1.19 Agent Contaminated Sludge and Aqueous Waste	MPF	HRA Metals	TE-LOP-557, 3050 or 3051 and 6010 or 6020 and 7470	Each WIC	Coliwasa or Pipette.
2.2.1.20 Autoclave Secondary Waste Management	Autoclave	Generator knowledge and function testing approvals			

Footnotes:

1. Analytical methods included those unique to TOCDF (designated as TE-LOP-XXX) and EPA SW-846 methods.
2. A batch is defined as all the drums (or containers) of waste generated from the same event, at the same location.
3. TCLP organics are defined as those compounds described by 40 CFR 261.24 by the waste codes D018, D019, D021, D022, D023, D024, D025, D026, D027, D028, D029, D030, D032, D033, D034, D035, D036, D037, D038, D039, D040, D041, and D042.
4. Dioxins (PCDDs) and Furans (PCDFs) are additionally analyzed for only if waste is Toxicity Characteristic for organics.
5. In addition, the Permittee shall sample the organic analytical parameters using the sampling and analytical methods in accordance with Section 2.10.
6. TCLP metals are defined as those described in 40 CFR 261.24 as waste codes D004, D005, D006, D007, D008, D009, D010 and D011.
7. HRA metals are defined as the following Arsenic, Barium, Chromium, Cadmium, Lead, Mercury, Silver, Selenium, Aluminum, Antimony, Beryllium, Boron, Cobalt, Copper, Manganese, Nickel, Thallium, Tin, Vanadium and Zinc.
8. The annotated methods identified are to be used. When new promulgated methods are approved by EPA, the Permittee shall notify the laboratory of the required change and request a time frame of when the change will occur. The laboratory will have six months to submit documentation to the Permittee of the change or a time frame when the change will be completed. The laboratory must use the most promulgated method within one year of promulgation. If that is not possible, a written request for extension must be provided to the Executive Secretary for approval.

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	PREPARATION and ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.2. LIC Slag	LIC 1 LIC 2	TCLP Metals	1311 and 3010 or 3015 and 6010 or 6020 and 7470	After each rebricking, one sample composited from each container comprising a batch will be analyzed. If the metals concentration exceeds the metals regulatory limits each subsequent batch shall be analyzed for metals until the applicable waste codes no longer apply.	Hammer and Chisel or Coring Device
2.2.2.3 Reserved					
2.2.2.4 Treated Burster & Fuse Bodies/Ash	DFS HDC	Agent Concentration TCLP Metals TCLP Organics[3]	TE-LOP-572 1311 and 3010 or 3015 and 6010 or 6020 or 7470 1311 and 5030 and 8260 and 3510 or 3520 and 8270	Each agent/munitions campaign or annually, whichever is shorter: One grab sample from each HDC waste bin generated in an operational 12 hr shift, composited into one sample for analysis. Not required if ash is not generated.	Thief, Scoop or Coring Device
2.2.2.5 Reserved					
2.2.2.6 DFS Cyclone Residues	DFS	Agent Concentration	TE-LOP-572	One core sample from each container generated	Scoop or Coring Device
		Agent Concentration TCLP Metals TCLP Organics[3]	TE-LOP-572 1311 and 3010 or 3015 and 6010 or 6020 and7470 1311 and 5030 and 8260 (volatiles) and 3510 or 3520 and 8270 (semi-volatiles)	Every three months or each agent/munitions campaign whichever is shorter: One core sample from each container comprising a batch, composited into one sample for analysis.	
		PCDD/PCDF Explosives	8280 or 8290 8330 and 8332	If analytical results demonstrate the waste to be TC for organics, waste stream shall be analyzed for dioxins/furans and explosives	
2.2.2.7 Treated Bulk Containers/Projectiles/Mortar Rounds	MPF	Chemical Agent Concentration	See Section 2.2.2.7	Each Burn Tray: Monitor a minimum of one cycle	ACAMS

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	PREPARATION and ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
		Initial mustard 155 mm Projectiles		One composite sample from the first full tray of 48 mustard 155mm projectiles processed in the MPF at the minimum residence time.	Scoop of projectile ash contents after cutting the projectile to reveal the agent cavity.
		Agent Concentration	TE-LOP-572		
		HRA Metals	3050 and 6010 or 6020 and 7470		
		TCLP Metals (see Table 2-4a)	1311 and 3010 or 3015 and 6010 or 6020 or 7470		
		TCLP Organics[3]	1311 and 5030 and 8260 (volatiles) and 3510 or 3520 and 8270		
		Total Volatile Organics (See Table 2-4b)	5035 and 8260		
		Total Semi-Volatile Organics (See Table 2-4c)	3540 or 3545 and 8270, 8280 or 8290 (for PeCDD/PeCDFs)		
		Dioxins/furans	1668 (for PCBs)		
		PCBs			
		Verification Analysis of mustard 155mm Projectiles			
		Agent Concentration	TE-LOP-572	One composite sample from one tray of mustard 155mm projectiles processed in the MPF on a monthly basis.	
		TCLP Metals	1311 and 3010 or 3015 and 6010 or 6020 or 7470	One composite sample from one tray of mustard 155mm projectiles processed in the MPF on a quarterly basis.	
		Additional Analysis as required by the Executive Secretary based upon results of the initial characterization.	TBD	TBD	
2.2.2.8 MPF Treated Debris: Table 2-5 waste residues	MPF	Agent Concentration (Air)	See Section 2.2.2.8 TE-LOP-522/ TE-LOP-524	Each Burn Tray: Monitor a minimum of one cycle	ACAMS

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	PREPARATION and ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.9 MPF Burn Tray, WIC, Mustard 155mm projectile residues and Cutaway Ton Container Residues	MPF	Agent Concentration HRA Metals TCLP Metals (see Table 2-4a) TCLP Organics[3] Total Volatile Organics (See Table 2-4b) Total Semi-Volatile Organics (See Table 2-4c) Dioxins/furans PCBs	TE-LOP-572 TE-LOP-557, 3050 or 3051 and 6010 or 6020 and 7470 or 7471 1311 and 3010 or 3015 and 6010 or 6020 or 7470 1311 and 5030 and 8260 (volatiles) and 3510 or 3520 and 8270 5035A and 8260 3540 or 3545 and 8270, 8280 or 8290 (for PeCDD/PeCDFs) 1668 (for PCBs)	Each Shipping container (drum or roll-off) generated a representative sample.	Thief, Scoop or Coring Device
2.2.2.10 MPF Munitions, Ton containers residues,	MPF	Agent Concentration HRA Metals TCLP Metals (see Table 2-4a) TCLP Organics[3] Total Volatile Organics (See Table 2-4b) Total Semi-Volatile Organics (See Table 2-4c)	TE-LOP-572 3050, or 3051 and 6010 or 6020 and 7470 or 7471 1311 and 3010 or 3015 and 6010 or 6020 and 7470 1311 and 5030 and 8260 (volatiles) and 3510 or 3520 and 8270 5035A and 8260 3540 or 3545 and, 8270, 8280 or 8290 (for PeCDD/PeCDFs) 1668 (for PCBs)	For MPF treated munitions and non-baseline ton containers, collect a representative sample from each shipping container (drum or roll-off) generated. For MPF treated baseline ton containers collect one representative sample for analysis from a shipping container (e.g., drum) on a quarterly basis (every three months).	Thief, Scoop or Coring Device
2.2.2.11 Incinerator Refractory	LIC 1 LIC 2 MPF DFS	TCLP Metals	1311and 3010 or 3015 and 6010 or 6020 or 7470	Each chamber change out: One grab sample from 10% of the containers comprising a batch, composited into one sample for analysis	Hammer and Chisel or Coring Device

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	PREPARATION and ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.12 PAS Residues	DFS PAS LIC 1 PAS LIC 2 PAS MPF PAS	Agent Concentration Corrosivity (pH)	TE-LOP-572 TE-LOP-574 (9040 or 9045)	Each container: One core sample for analysis	Trier or Coring Device
		Free Liquids TCLP Metals TCLP Organics[3]	TE-LOP-574 (9095) 1311 3010 or 3015 and 6010 or 7470 1311 and 5030 and 8260 (Volatiles) and 3510 or 3520 and 8270(semi-volatiles)	Initially for a new agent or munition campaign then every three months thereafter.	Trier or Coring Device
2.2.2.13 Scrubber Brines	DFS PAS LIC 1 PAS LIC 2 PAS MPF PAS BRA TANKS	Agent Concentration Corrosivity (pH) Specific Gravity	TE-LOP-572 TE-LOP-574 (9040) TE-LOP-574	Each BRA-TANK one sample for analysis prior to shipment, or each tanker if transferred directly from the PAS.	Tap, Coliwasa, or Bailer depending on sample location
		TCLP Metals TCLP Organics[3]	1311 and 3010 or 3015 and 6010 or 6020 and 7470 1311 and 5030 and 8260 (volatiles) and 3510 or 3520 and 8270	Each month or munition campaign change, whichever is sooner, one composite sample comprised of a sample from each BRA Tank.	Tap, Coliwasa, or Bailer, depending on sample location

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	PREPARATION and ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.13b Scrubber Brines	MPF PAS (During shakedownand post-trial burn	HRA metals	TE-LOP-557 or 3010 or 3015 and 6010 or 6020 and 7470	(Mustard 155mm Projos) One sample per week.	Tap of the on-line MPF PAS Brine Pump
2.2.2.14. SDS-TANK Sludge	SDS-TANK	Agent Concentration Corrosivity (pH) Free Liquids Explosives TCLP Metals TCLP Organics[3]	TE-LOP-572 TE-LOP-574 (9040 or 9045) TE-LOP-574 (9095) 8330 and 8332 1311and 3010 or 3015 and 6010 or 6020 and7470 1311 and 5030 and 8260 and 3510 or 3520 and 8270	Each batch of sludge.	Tap, Coliwasa, or Bailer depending on sample location
		Agent Concentration Corrosivity (pH) Free Liquids	TE-LOP-572 TE-LOP-574 (9040 or 9045) TE-LOP-574 (9095)	If the agent concentration is found to be greater than the WCL, decontamination solution will be added and another sample analyzed for agent, pH and free liquids..	
2.2.2.15. BRA-TANK Sludges	BRA-TANK	Agent Concentration Corrosivity (pH) Free Liquids TCLP Metals TCLP Organics[3]	TE-LOP-572 TE-LOP-574 (9040 or 9045) TE-LOP-574 (9095) 1311and 3010 or 3015 and 6010 or 6020 and, 74701311 and 5030 and 8260 and 3510 or 3520 and 8270	Each batch of sludge.	Trier or Coring Device
2.2.2.16. PAS Demister Candle Sleeves	DFS PAS LIC 1 PAS LIC 2 PAS MPF PAS	Agent Concentration TCLP Metals TCLP Organics[3]	TE-LOP-572 1311 and 3010 or 3015 and 6010 or 6020 and 7470 or 7471 1311 and 5030 and 8260 and 3510 or 3520 and 8270	Each change out: Grab samples representative of the waste stream will be analyzed prior to shipment	Determined worse case section cut sleeve
2.2.2.17. Reserved					
2.2.2.18. Reserved					
2.2.2.19. Reserved					

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	PREPARATION and ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.20. Dunnage Generated in the Unpack Area	UPA	Chemical Agent TCLP Metals TCLP Organics	TE-LOP-572 1311 and 3010 or 3015 and , 6010 or 6020 and 7470 1311 and 5030 and 8260 (volatiles) and 3510 or 3520 and 8270 (semi-volatiles)	One composite sample for analysis collected from a container on a quarterly basis (Every three months)	Wood plane to collect shavings from dunnage surface/ discolored or stained areas selected for sampling
2.2.2.21. DPE Suits	MDB	Agent Concentration (air)	ACAMS TE-LOP-524/DAAMS TE-LOP-522	Each bag of DPE suits, monitored for chemical agent. (P999/F999). Suits with results below 1.0 VSL may be disposed of off-site..	Head-Space Monitoring
2.2.2.22. Spent Non-Agent Contaminated Hydraulic Fluid and Lubricating Oil	MDB	Agent Concentration TCLP Organics[3] HRA metals	TE-LOP-572 1311 and 5030 and 8260(volatile) and 3510 or 3520 and 8270 (semi-volatile) 3050 or 3051 and 6010 or 7470 or 7471 TE-LOP-557 or 3010 or 3015 and 6010 or 6020 and 7470	Each batch: One sample each from 10% of the drums comprising a batch, composited into one sample for analysis	Coliwasa
2.2.2.23. Reserved					
2.2.2.24. CAL Aqueous Waste	CAL	Agent Concentration Corrosivity (pH) Ignitability TCLP Metals TCLP Organics[3]	TE-LOP-572 TE-LOP-574 (9040) 1010 or 1020 1311 and 3010 or 3015 and 6010 or 6020 and 7470 1311 and 5030 and 8260 and 3510 or 3520 and 8270	Each container: One sample for analysis	Coliwasa
2.2.2.25. CAL Solid Wastes (debris)	CAL	Agent Concentration	TE-LOP-572	Each container: One sample of the decontamination solution collected at the bottom of the accumulation container taken for analysis	Coliwasa

Table 2-1
TOCDF WASTE ANALYSIS PLAN SUMMARY

2.2.2 WASTES REQUIRING OFF-SITE TREATMENT/DISPOSAL

WASTE STREAM	GENERATION SOURCE	ANALYTICAL PARAMETERS[5]	PREPARATION and ANALYTICAL METHODS[5]	FREQUENCY OF ANALYSIS[5] (establish profile)	SAMPLING METHOD
2.2.2.26. MSB Solid Waste (debris)	MSB	Chemical Agent Concentration See section 2.2.2.25	TE-LOP-572	Each container: One sample of the decontamination solution collected at the bottom of the accumulation container taken for analysis	Coliwasa
2.2.2.27 Sump 110	Sump 110	Agent Concentration TCLP Metals TCLP Organics[3] Corrosivity/pH	TE-LOP-572 1311 and 3010 or 3015 and 6010 or 6020 and 7470 1311and 5030 and , 8260 and 3510 or 3520 and 8270 TE-LOP-574 (9040)	Each tanker: One sample for analysis	Coliwasa
2.2.2.28. Autoclave Treated Waste	Area 10 (Igloo 1631) Subpart X Autoclave	Agent	TE-LOP-524 (Primary) TE-LOP-522 (Confirmation)	Each Batch Treated	ACAMS (Primary) DAAMS (Confirmation)

Footnotes:

1. The annotated methods identified are to be used. When new promulgated methods are approved by EPA, the Permittee shall notify the laboratory of the required change and request a time frame of when the change will occur. The laboratory will have six months to submit documentation to the Permittee of the change or a time frame when the change will be completed. The laboratory must use the most promulgated method within one year of promulgation. If that is not possible, a written request for extension must be provided to the Executive Secretary for approval.
2. A batch is defined as all the drums (or containers) of waste generated from the same event, at the same location.
3. TCLP organics are defined as those compounds described by 40 CFR 261.24 by the waste codes D018, D019, D021, D022, D023, D024, D025, D026, D027, D028, D029, D030, D032, D033, D034, D035, D036, D037, D038, D039, D040, D041, and D042.
4. Dioxins (PCDDs) and Furans (PCDFs) are additionally analyzed for only if waste is Toxicity Characteristic for organics.
5. The Permittee shall sample the organic analytical parameters using the sampling and analytical methods and frequency of analysis in accordance with section 2.10.
6. TCLP metals are defined as those described in 40 CFR 261.24 as waste codes D004, D005, D006, D007, D008, D009, D010 and D011.
7. HRA metals are defined as the following Arsenic, Barium, Chromium, Cadmium, Lead, Mercury, Silver, Selenium, Aluminum, Antimony, Beryllium, Boron, Cobalt, Copper, Manganese, Nickel, Thallium, Tin, Vanadium and Zinc.

Table 2-2:
Site-Generated Waste Streams

Waste Stream	Description	EPA Waste Codes[1]	Utah Waste Code
MPF Metal	Metal parts after incineration.	N/A	F999
MPF Residue	MPF maintenance residue.	D006, D008	F999
LIC Slag (hazardous)	Slag generated in LIC secondary chamber.	D007	F999
LIC Refractory (hazardous)	Produced during refractory changeout.	D007	F999
DFS HDC Ash (hazardous)	Produced during the incineration of munitions.	D006, D008	F999
DFS Cyclone Residue	Produced during the incineration of munitions.	D006, D007, D008	F999
DFS Refractory	Produced during refractory changeout.	N/A	F999
Brine Tank Sludge (hazardous)	Produced during the cleanout of tanks that store scrubber brine.	D006, D007, D008	F999
Demister Filters (hazardous)	Produced during the changeout of demister filters.	D006, D008	F999
PAS Quench Tower Residue	Produced during the cooling of the off-gas.	N/A	F999
PAS Sump Sludge (hazardous)	Generated during the cleanout of the PAS sumps.	D005, D006, D007, D008, D011	F999
RHA Baghouse Residue	Residue collected from baghouse.	D006, D008	F999
Decontamination- Neutralization Solutions	Produced from site decontamination and laboratory operations[2].	D002, D008, D018, D022, F002, F003, F005, D019, D022, D028	F999
Waste Heavy Metal Solution - Acidic, Oxidizing	Generated at the Laboratory.	D001, D002, D004, D006, D007, D008, D009, D010	F999
Waste Acid Solution	Generated at the Laboratory.	D002	F999
Waste Organic Solvents	Generated at the Laboratory.	D001, F002, F003, F005	F999
DPE Suits	Generated during toxic operations.	D003	F999/P999
Wood Pallets	Produced during the unpacking of ONCs and munitions.	N/A	F999/P999
Spent Activated Carbon	Produced during the changeout of carbon filters.	D003	F999, P999
Miscellaneous Metal Parts	Worn out equipment and parts.	D006, D008	F999
Clean-up Materials	Miscellaneous materials generated during the decontamination and maintenance of the plant.	N/A	F999
Incinerator Byproducts	Byproducts from maintenance activities.	D007	F999
Spent Hydraulic Fluid	Produced during maintenance activities.	N/A	F999
Waste Oil	Produced during maintenance activities.	F001, F002, D001	F999
Waste Paint Liquids	Produced during maintenance activities.	D001, D005, D007, D008, F002, F003, F005	F999
Waste Paint Solids	Produced during maintenance activities.	D007, D008, F002, F003, F005	F999
Spill Cleanup Materials	Generated during single substance spill response cleanup.	N/A	F999
Trash, Debris, & PPE	Produced during maintenance activities.	D003	P999/F999
Broken Fluorescent Lightbulbs	Produced during maintenance activities	D009	
CAL Lab Liquids	Miscellaneous materials generated after decontamination activities	D001, D002, D022	F999
CAL Lab Solids	Miscellaneous materials generated after decontamination activities	F003, F005,	F999
DFS Demister Candle Packing	Produced during change out of demister candles		P999
Flammable Aerosols	Off-spec/expired shelf life material	D001, D007, D008, D035, D039	
Flammable Labpacks	Off-spec/expired shelf life material	D001	P999, F999
IPA/Glycol	Surrogate during systemization of plant equipment	D001	F999

Table 2-2:
Site-Generated Waste Streams

Waste Stream	Description	EPA Waste Codes[1]	Utah Waste Code
Lab acids	Off-spec/expired shelf life material	D001, D002, D006, D008, D019, D022, F003	F999
Lab Solvents	Off-spec/expired shelf life material	D001, D002, F003, U080	F999
Lead Acid Batteries	Battery Change out	D002, D008	F999
Lithium Batteries	Battery Change out	D003	F999
M40 Canisters	Generated during toxic operations		F999, P999
Monitoring Solids	Discarded monitoring and sampling equipment.		F999, P999
MPF Brick	MPF refractory replacement	D007	F999
MPF Vacuum Ash	Residue removed from MPF burn trays and munitions.	D006, D007, D008	F999
MSB Cleaning Solutions	Cleaning of sampling equipment		F999
NiCad Batteries	Battery Change out	D006,	F999
PAS Piping	PAS piping repairs and replacements		F999, P999
PAS Solids	Solids collected in PAS filters and removed from quench towers and scrubbers	D006, D007, D008	F999, P999
Sodium Lamps	Light Bulb replacement	D005, D008, D009	F999, P999
Spent IPA	Cleaning ACAMS equipment	D001	F999, P999
Spent Scrubber Brine	Generated from incineration operation	D004, D007, D008	F999, P999
Sump 110 Sludge	Sump 110 clean out		F999, P999
Tap Gear	Generated during toxic operations		F999, P999

Footnotes:
1. The waste codes are determined by analysis and/or generator knowledge. Additional waste codes may apply.

Table 2-3: Analytical Method Descriptions	
Method	**Description/Title**
ASTM D 482	Test Method for Ash from Petroleum Products
ASTM D5865	Test Method for Gross Calorific Value of Coal and Coke
SW-846 1010	Pensky – Martens Closed-Cup Method for Determining Ignitability
SW-846 1020A	Setaflash Closed-Cup Method for Determining Ignitability
SW-846 1311	Toxicity Characteristic Leaching Procedure.
SW-846 3010A	Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy.
SW-846 3015	Microwave Assisted Digestion of Aqueous Samples and Extracts
SW-846 3050	Acid Digestion of Sediments, Sludges, and Soils.
SW-846 3051	Microwave Assisted Acid Digestion of Sediments, Sludges, Soils and Oils
SW-846 3510C	Separatory Funnel Liquid-Liquid Extraction.
SW-846 3052	Microwave Assisted Digestion of Siliceous and Organically Based Matrices
SW-846 3520C	Continuous Liquid-Liquid Extraction.
SW-846 3541	Automated Soxhlet Extraction
SW-846 3540C	Soxhlet Extraction
SW-846 3545	Pressurized Fluid Extraction
SW-846 3580A	Waste Dilution.
SW-846 5030B	Purge and Trap
SW-846 5035	Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples
SW-846 6010B	Inductively Coupled Plasma - Atomic Emission Spectroscopy.
SW-846 6020	Inductively Coupled Plasma-Mass Spectrometry
SW-846 7470A	Mercury in Liquid Waste (Manual Cold-Vapor Technique).
SW-846 7471A	Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique)
SW-846 8260B	Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique.
SW-846 8270C	Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS): Capillary Column Technique.
SW-846 8290	Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High Resolution Gas Chromato~~r~~graphy/High-Resolution Mass Spectrometry (HRGC/HRMS)
SW-846 8280A	Analysis of PCDDs and PCDFs by HRGC/LRMS
SW-846 8330	Nitroaromatics and Nitramines by High Performance Liquid Chromatography (HPLC)
SW-846 8332	Nitroglycerine by High Performance Liquid Chromatography
SW-846 9040B	pH Electrometric Measurement.
SW-846 9045C	Soil and Waste pH
SW-846 9056	Determination of Inorganic Anions by Ion Chromatography
SW-846 9095A	Paint Filter Liquids Test
EPA 160.1	Total Dissolved Solids (TDS)~~.~~
EPA 160.2	Total Suspended Solids (TSS)~~.~~
EPA-1668	Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by HRGC/HRMS
TE-LOP-522	Laboratory Operating Procedure for Depot Area Air Monitoring Systems (DAAMS)
TE-LOP-524	Laboratory Operating Procedure for Automatic Continuous Air Monitoring System (ACAMS)
TE-LOP-557	Analysis of Metals by Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)
TE-LOP-572	Extractions/Analyses Including: WCL Extraction of GB for the Metals Diluent Solution; DWS Extraction of VX and HD; Extraction of GB, HD, and VX from Hydraulic Fluid; Analysis of GB, HD, and VX in Lubricating Oils; Analysis of GB, HD, and VX in Organic Wastes; and Extraction of GB, HD, and VX from Wood.
TE-LOP-574	Special Analyses Including: Specific Gravity Measurements.
TE-LOP-584	Neat Agent OPS/GC Including: GC-FID and GC-MSD Analyses of Agent Samples to Determine

	Agent Purity.

Table 2-4a
Metals (Universal Treatment Standards)

1	Antimony	1.15 mg/l TCLP	6	Chromium (Total)	0.6 mg/l TCLP	11	Silver	0.14 mg/l TCLP
2	Arsenic	5 mg/l TCLP	7	Lead	0.75 mg/l TCLP	12	Thallium	0.2 mg/l TCLP
3	Barium	21 mg/l TCLP	8	Mercury	0.025 mg/l TCLP	13	Vanadium	1.6 mg/l TCLP
4	Beryllium	1.22 mg/l TCLP	9	Nickel	11 mg/l TCLP	14	Zinc	4.3 mg/l TCLP
5	Cadmium	0.11 mg/l TCLP	10	Selenium	5.7 mg/l TCLP			

Table 2-4b[1]
Volatile Organic Compounds Universal Treatment Standards

1	Acetone (160 mg/kg)	15	1,2-Dibromoethane (15mg/kg)	29	1,1,1,2-Tetrachloroethane (6mg/kg)
2	Benzene (10mg/kg)	16	Dibromomethane (15mg/kg)	30	1,1,2,2-Tetrachloroethane (6mg/kg)
3	Bromodichloromethane (15mg/kg)	17	1,1-Dichloroethane (6mg/kg)	31	Tetrachloroethylene (6 mg/kg)
4	Bromomethane (15mg/kg)	18	1,2-Dichloroethane (6mg/kg)	32	Toluene (10mg/kg)
5	2-Butanone (Methyl ethyl ketone 36 mg/kg)	19	1,1-Dichloroethylene (6mg/kg)	33	Tribromomethane (Bromoform) (15mg/kg)
6	Carbon disulfide (4.8mg/l TCLP)	20	*trans*-1,2-Dichloroethylene (30mg/kg)	34	1,1,1-Trichloroethane (6mg/kg)
7	Carbon tetrachloride (6 mg/kg)	21	1,2-Dichloropropane (18mg/kg)	35	1,1,2-Trichloroethane (6mg/kg)
8	Chlorobenzene (6mg/kg)	22	*cis*-1,3-Dichloropropylene (18mg/kg)	36	Trichloroethylene (6mg/kg)
9	2-Chloro-1,3-butadiene (0.28mg/kg)	23	*trans*-1,3-Dichloropropylene (18mg/kg)	37	Trichlorofluoromethane (30mg/kg)
10	Chlorodibromomethane (15mg/kg)	24	1,4-Dioxane (170mg/kg)	38	1,2,3-Trichloropropane (30 mg/kg)
11	Chloroethane (6mg/kg)	25	Ethylbenzene (10mg/kg)	39	1,1,2-Trichloro-1,2,2-trifluoroethane (30 mg/kg)
12	Chloroform (6mg/kg)	26	Iodomethane (65mg/kg)	40	Vinyl Chloride (6 mg/kg)
13	2-Chloroethyl vinyl ether (NA)	27	Methylene chloride (30mg/kg)	41	Xylene (o-m-,p-) (30 mg/kg)
14	Chloromethane (30mg/kg)	28	Methyl isobutyl ketone (33 mg/kg)		

[1] TOCDF may demonstrate compliance with organic constituents Universal Treatment Standards if good-faith analytical efforts achieve detection limits for the regulated organic constituents that do not exceed the treatment standards specified in the Table found in 40 CFR 268.40 by an order of magnitude.

Table 2-4c[1]
Semi-Volatile Organic Compounds (Universal Treatment Standards)

1	Acenaphthylene (3.4mg/kg)	23	p-Cresol (5.6mg/kg)	45	Hexachlorocyclopentadiene (2.4mg/kg)
2	Acenaphthene (3.4mg/kg)	24	Dibenz(a,h)anthracene (8.2mg/kg)	46	Hexachloroethane (30mg/kg)
3	Acetophenone (38mg/kg)	25	m-Dichlorobenzene (6mg/kg)	47	Indeno(1,2,3-c,d) pyrene (3.4mg/kg)
4	Aniline (14mg/kg)	26	o-Dichlorobenzene (6mg/kg)	48	Naphthalene (5.6mg/kg)
5	Anthracene (3.4mg/kg)	27	p-Dichlorobenzene (6mg/kg)	49	2-Naphthylamine (NA)
6	Benz(a)anthracene (3.4 mg/kg)	28	2,4-Dichlorophenol (14mg/kg)	50	2-Nitroaniline (14mg/kg)
7	Benzo(b)fluoranthene (6.8mg/kg)	29	2,6-Dichlorophenol (14mg/kg)	51	4-Nitroaniline (28mg/kg)
8	Benzo(k)fluoranthene (6.8mg/kg)	30	Diethyl phthalate (28mg/kg)	52	Nitrobenzene (14 mg/kg)
9	Benzo(g,h,i)perylene (1.8mg/kg)	31	2,4-Dimethyl phenol (14mg/kg)	53	2-Nitrophenol (13mg/kg)
10	Benzo(a)pyrene (3.4mg/kg)	32	Dimethyl phthalate (28mg/kg)	54	4-Nitrophenol (29mg/kg)
11	4-Bromophenyl phenyl ether (15mg/kg)	33	Di-n-butyl phthalate (28mg/kg)	55	Pentachlorobenzene (10mg/kg)
12	Butyl benzyl phthalate (28mg/kg)	34	1,4-Dinitrobenzene (2.3mg/kg)	56	Pentachloroethane (6mg/kg)
13	p-Chloroaniline (16mg/kg)	35	4,6-Dinitro-o-cresol (160mg/kg)	57	Pentachloronitrobenzene (4.8 mg/kg)
14	*Bis*(2Chloroethoxy)methane (7.2mg.kg)	36	2,4-Dinitrophenol (160mg/kg)	58	Pentachlorophenol (7.4mg/kg)
15	*Bis*(2-Chloroethyl)ether (6mg/kg)	37	2,4-Dinitrotoluene (140mg/kg)	59	Phenanthrene (5.6mg/kg)
16	*Bis*(2-Chloroisopropyl) ether (7.2mg/kg)	38	2,6- Dinitrotoluene (28mg/kg)	60	Phenol (6.2 mg/kg)
17	4-Chloro-3-methylphenol (14mg/kg)	39	Di-n-octyl phthalate (28mg/kg)	61	Pyrene (8.2mg/kg)
18	2-Chloronaphthalene (5.6mg/kg)	40	Diphenylamine (13mg/kg)	62	1,2,4,5-Tetrachlorobenzene (14mg/kg)
19	2-Chlorophenol (5.7mg/kg)	41	Fluoranthene (3.4mg/kg)	63	2,3,4,6-Tetrachlorophenol (7.4 mg/kg)
20	Chrysene (3.4mg/kg)	42	Fluorene (3.4mg/kg)	64	1,2,4-Trichlorobenzene (19mg/kg)
21	o-Cresol (5.6mg/kg)	43	Hexachlorobenzene (10mg/kg)	65	2,4,5-Trichlorophenol (7.4mg/kg)
22	m-Cresol (5.6mg/kg)	44	Hexachlorobutadiene (5.6mg/kg)	66	2,4,6-Trichlorophenol (7.4mg/kg)

[1] TOCDF may demonstrate compliance with organic constituents Universal Treatment Standards if good-faith analytical efforts achieve detection limits for the regulated organic constituents that do not exceed the treatment standards specified in the Table found in 40 CFR 268.40 by an order of magnitude.

Table 2-5 Agent Contaminated Waste That May Be Treated in The MPF	
Waste Stream and Quantity (if Applicable)	**Waste Code**(s)
Assorted Parts/Material Conveyors Chains, Rollers, Links Gears, Bearings, Bushings Wheels, Idlers Gearboxes Gasket Materials (non-combustible) Seals (non-combustible) Pre-filters and HEPA filters Carbon Adsorber Trays (from which carbon has been removed) Collets Drain Probes Crimp Jaws and Pins Bore Station Blades Turntable Projectile Bushings Projectile Pickup Heads Shear Blades Punches Pusher Assemblies Paper, Cloth, Pads, Pillows, Spill Adsorbents (Cellulose/polypropylene) (Maximum, 28 lbs/charge for a single charge at 20,000 BTU/lb at 1450° F) (Maximum 16 lbs/charge for consecutively charged trays containing paper, cloth, pads, pillows and spill absorbents, at 20,000 BTU/lb at 1450° F) Jaw Gripper Assemblies Projectile Cans Hoists	P999[1]
Electrical Components Motors Conduit (Metal) Solenoids Switches (Safety, Limit, Light) Light Fixtures, maximum of 20 units per furnace charge	P999[1]

Plumbing Materials Pumps Piping/Fittings/Tubing (metal) Chemical Seals Hydraulic Motors Hydraulic Cylinders Hydraulic Tubing/Fittings (metal) Hydraulic Hose/Fittings (metal) Pressure Regulators Flow Control Valves Pneumatic Actuators Accumulator Bladders Filter Cartridges/Elements and associated residue/cleanup material (includes AQS/ACS filter elements) Spray Nozzles Pipe Gaskets Valves (Hand, Solenoid, Agent, Decon, Hydraulic)	P999[1]
Instrumentation Test Equipment (Meters, Gauges, Etc.) Sensors, Transmitters, and Transducers Flow, Pressure, and Proximity Switches Pressure Gauges Cameras or Camera Parts Load Cells Speakers Low Volume Agent Samplers Thermocouples and Thermowells	P999[1]

Assorted Solids Hand Tools Grating Metal Buckets, Pans, and Barrels Metal Brackets, Stands, Fixtures, Etc Escape Air Tank, Mask, and Regulators Scrub Brushes Banding Material Empty Overpacks/Drums (Non-Combustible) Monitoring Sample Probes (DAAMS Tubes, etc.) Silicone material/parts Glassware Plaster Paint Brushes, Rollers, and Pans Empty Paint and Lubricant Spray Cans (Punched), maximum 25 units per furnace charge Personal Protective Equipment (non-combustible) DPE Leather Over Garments, maximum 10 units per furnace charge Plastic bags used to contain contaminated wastes, a maximum of 1.0 lb per furnace charge	P999[1]

[1] In addition to the P999 waste code, the above-mentioned waste streams may carry the following waste codes: F999, D002, D004, D005, D006, D007, D008, D009, D010, and D011.

Table 2-A-1 CHEMICAL AGENT PHYSICAL PROPERTIES

PROPERTY	GB	VX	H	HD	HT
Chemical Name	Isopropyl methyl-phosphonofluoridate (Sarin)	O-ethyl-S[2-(diisopropyl-amino)ethyl] methylphosphonothiolate	Same as HD with up to 25% impurities	Bis(2-chloroethyl) sulfide or 2,2'-dichlorodiethyl sulfide (sulfur mustard)	Same as HD with 40% T Bis[2(-chloroethylthio) ethyl] ether
Chemical formula	$C_4H_{10}FO_2P$	$C_{11}H_{26}NO_2PS$	$C_4H_8Cl_2S_{1.5}$	$C_4H_8Cl_2S$	$C_{5.15}H_{10.3}Cl_{2.0}O_{0.29}S_{1.29}$
Molecular weight	140.0951	267.37262	175.11016	159.07816	189.14764
Vapor specific gravity (air = 1.00)	4.86	9.2	5.4	5.4	6.92
Liquid density at 77° F[1] (lb/ft^3)	67.965	62.93	79.49	79.49	79.49
Freezing point (° F)	-69	Below -60	41 to 57	58	32 to 34.3
Boiling Point (°F)	316	572	437	423	442
Vapor pressure at 77°F[1] (mm Hg)	2.9	0.00063	0.059	0.11	0.104
Flash Point (° F)	Does not flash	318	212	221	212
Viscosity (centistokes) at 77° F [1]	1.28	9.96 (pure); may be substantially higher if partially decomposed	3.95	3.95	6.05
Color	Clear to straw to amber	Clear to straw	Amber-dark brown liquid		
Odor	None	None	Garlic		
Special properties	None		Permeates ordinary rubber		
Solubility properties	Miscible with water and readily soluble in all organic solvents	Best solvents are dilute mineral acids	Water (distilled), 0.092 g/100 cc at 72° F; completely soluble in acetone, CCl_4,CH_3Cl, tetrachloroethane, ethyl benzoate, ether)		
High heating value (Btu/lb at 60° F)	10073	15174	8100	8500	9,400
Physical state	Viscous liquid				

[1] Agents H and HT are at 68° F.

Table 2-A-2
CHEMICAL AGENT COMPOSITION

AGENT	CHEMICAL CONSTITUENT	Minimum Value (Wt%)	Maximum Value (Wt%)
GB	**Isopropyl methyl phosphonofluoridate (GB Agent)**	37	97
	N,N'-Diisopropylcarbodiimide (DICDI)	0	1.9
	Tributylamine (TBA)	1	9.5
	Methylphosphonofluoridic acid (MPA)[1]	0	8.35
	Diisopropyl methylphosphonate (DIMP)	0.9	27
	Methylphosphonofluoridic acid (MPFA)[1]	2.6	13.65
	Diispropyl urea (DIU)	0	2.4
	Diethyl methyl phosphonate (DEMP)	0.6	0.6
	Isopropylmethylphosphonic acid (IMPA)[1]	0.05	25.8
	Fluoride (F)[1]	0.1	2.8
	Density (g/ml)	1	1.2
	Metals	**Minimum (mg/kg)**	**Maximum (mg/kg)**
	Aluminum	4.7	3205
	Antimony	0.04	154
	Arsenic	0.72	556
	Barium	0.0094	40
	Beryllium	0.002	1
	Boron	1.1	4585
	Cadmium	0.011	7.9
	Chromium	0.72	54
	Cobalt	0.07	10.9
	Copper	0.25	120
	Iron	18	4855
	Lead	0.092	801
	Manganese	0.13	110
	Mercury	0.0061	9.1
	Nickel	0.72	415
	Selenium	<0.5	92
	Silver	0.004	13
	Thallium	<.14	154
	Tin	0.15	308
	Vanadium	0.33	10

Note:
1. The parameter is analyzed if the mass balance of the initial agent organic analysis is found to be 80% or less.

Table 2-A-2
CHEMICAL AGENT COMPOSITION

AGENT	CHEMICAL CONSTITUENT	Minimum Value (Wt%)	Maximum Value (Wt%)
VX[1]	**O-ethyl, S-[2-(diisopropylamino)ethyl] methylphosphonthiolate (VX Agent)**	59.6	96.7
	Ethyl methylphosphonic acid (EMPA)[2]	0.460	5.42
	N,N'-Dicyclohexylcarbodiimide (DCC or DCHCDI)	0.02	4.15
	bis(2-Diisopropylaminoethyl) disulfide (KM or EA 4196)[3]	0.60	2.3
	N,N'-Diisopropylcarbodiimide (DICDI)	ND	2.20
	S-(2-Diisopropylaminoethyl)methylphosponothioic acid (EA 2192)[3]	0.11	0.34
	bis(2-Diisopropylaminoethyl) sulfide (KK)	0.2	0.4
	Diethyl methylphosphonate (DEMP)	0.02	0.18
	Methylphosphonic acid (MPA)[2]	ND	ND
	Chlorine	0.306	0.514
	Metals	**Minimum (mg/kg)**	**Maximum (mg/kg)**
	Aluminum	1.5	1.8
	Antimony		ND
	Arsenic	ND	78
	Barium	ND	1.0
	Beryllium		ND
	Boron		ND
	Cadmium		ND
	Chromium	ND	12
	Cobalt		ND
	Copper	ND	6.7
	Iron	6.9	53
	Lead	ND	6.5
	Manganese		ND
	Mercury	ND	0.78
	Nickel		ND
	Selenium	ND	44
	Silver		ND
	Thallium		ND
	Tin		ND
	Vanadium	2.9	3.3
	Zinc	0.9	10.9

Notes:
1. Data are taken from the Bulk Agent Stockpile Survey Report and 2001 Agent VX Characterization.
2. The parameter is analyzed if the mass balance of the initial agent organic analysis is found to be less than 85%.
3. The parameter is analyzed during shakedown and trial burn sampling only.
ND = Not Detected

Table 2-A-2
HD-Filled Ton Containers, Liquid Contents, Baseline
CHEMICAL AGENT COMPOSITION[1]

AGENT	CHEMICAL CONSTITUENT	Average Value	Maximum Value	Minimum Value
HD	**Organic Compounds (Weight Percent)**			
	Bis (2-chloroethyl) sulfide (HD Agent)	89.31	101	78.7
	Thiodiglycol	0.026	0.029	0.0218
	1,2-Dichloroethane	0.606	0.993	0.197
	Tetrachloroethene	0.0502	0.0734	0.0127
	1,1,2,2-Tetrachloroethane	0.0518	0.0588	0.0472
	bis [2-(2-chloroethylthio)ethyl] ether (T)	0.169	0.355	0.0409
	1,2-*bis* (2-chloroethylthio) ethane (Q)	3.24	5.66	0.448
	Hexachloroethane	0.210	0.293	0.0245
	Lewisite[2] (mg/kg)	5.24	14.5	2.82
	1,4-Dithiane	1.10	5.6	0.028
	1,4-Thioxane	0.26	0.97	0.083
	2-Chloroethyl 4-chlorobutyl sulfide	0.51	3.0	0.079
	bis (2-Chloropropyl) sulfide	0.19	1.0	0.043
	Chlorine[3]	41.61	48.08	NA
	Metals (mg/kg)			
	Aluminum	38	55	12
	Antimony	5.09	5.5	0.67
	Arsenic	5.80	51.6	1.3
	Barium	5.08	5.5	0.44
	Beryllium	5.19	5.5	4.8
	Boron	9.34	11	4.0
	Cadmium	5.19	5.5	4.8
	Chromium	4.81	29.9	1.4
	Cobalt	1.03	1.1	0.33
	Copper	37.9	84.8	4.5
	Lead	4.71	5.5	0.47
	Manganese	1.67	6.49	0.33
	Mercury	0.35	0.55	0.054
	Nickel	3.40	15.7	0.36
	Selenium	10.1	11	1.2
	Silver	5.15	5.5	1.72
	Thallium	5.19	5.5	4.8
	Tin	10.4	11	9.54
	Vanadium	3.12	5.5	1.06
	Zinc	9.76	29.4	3.42

Notes:

1. The average, minimum and maximum concentration values shown in this table are based upon the results of the Mustard Sample Validation Project for the 80 of 98 ton containers sampled that contained less than one ppm Hg in their liquid contents. Data from the 18 of 98 ton containers that had elevated mercury concentrations are not included in these values.
2. The values for Lewisite are reported in mg/kg instead of "weight percent".
3. The values for chlorine were calculated as the total combined weight of chlorine in all of the chlorine-bearing organic compounds.

Table 2-A-2
Baseline HD-Filled Ton Containers, Solid Contents
CHEMICAL AGENT COMPOSITION[1]

AGENT	CHEMICAL CONSTITUENT	Average Value	Maximum Value	Minimum Value
HD	**Metals (mg/kg)**			
	Aluminum	36.2	160	10.8
	Antimony	2.05	30.3	0.179
	Arsenic	176	1850	0.935
	Barium	1.42	14.2	0.0467
	Beryllium	4.9	5.57	0.0572
	Boron	9.7	11.1	3.99
	Cadmium	0.888	5.34	0.0492
	Chromium	47.7	397	9.28
	Cobalt	7.63	27.1	2.00
	Copper	151	2350	4.13
	Lead	65.1	625	6.61
	Manganese	411	1960	47
	Mercury	1.59	25.6	0.0807
	Nickel	82.6	965	8.99
	Selenium	24.7	27.8	1.09
	Silver	4.41	5.55	0.0622
	Thallium	5.04	5.57	0.412
	Tin	9.39	52.6	0.966
	Vanadium	3.55	5.57	0.98
	Zinc	224	4950	2.62

Notes:

1. The average, minimum and maximum concentration values shown in this table are based upon the results of the Mustard Sample Validation Project for the 80 of 98 ton containers sampled that contained less than one ppm Hg in their liquid contents. Data from the 18 of 98 ton containers that had elevated mercury concentrations are not included in these values.

Table 2-A-2a
H-Filled 155-mm Projectiles, Liquid Contents
CHEMICAL AGENT COMPOSITION[1]

AGENT	CHEMICAL CONSTITUENT	Average Value[4]	Maximum Value[5]	Minimum Value[6]
H	**Organic Compounds (Weight Percent)**			
	Agent)	TBD	TBD	TBD
	Thiodiglycol	TBD	TBD	TBD
	1,2-Dichloroethane	TBD	TBD	TBD
	Tetrachloroethene	TBD	TBD	TBD
	1,1,2,2-Tetrachloroethane	TBD	TBD	TBD
	bis [2-(2-chloroethylthio)ethyl] ether (T)	TBD	TBD	TBD
	1,2-*bis* (2-chloroethylthio) ethane (Q)	TBD	TBD	TBD
	Hexachloroethane	TBD	TBD	TBD
	Lewisite[2] (mg/kg)	TBD	TBD	TBD
	1,4-Dithiane	TBD	TBD	TBD
	1,4-Thioxane	TBD	TBD	TBD
	2-Chloroethyl 4-chlorobutyl sulfide	TBD	TBD	TBD
	bis (2-Chloropropyl) sulfide	TBD	TBD	TBD
	Chlorine[3]	TBD	TBD	TBD
	Metals (mg/kg)			
	Aluminum	TBD	TBD	TBD
	Antimony	TBD	TBD	TBD
	Arsenic	TBD	TBD	TBD
	Barium	TBD	TBD	TBD
	Beryllium	TBD	TBD	TBD
	Boron	TBD	TBD	TBD
	Cadmium	TBD	TBD	TBD
	Chromium	TBD	TBD	TBD
	Cobalt	TBD	TBD	TBD
	Copper	TBD	TBD	TBD
	Lead	TBD	TBD	TBD
	Manganese	TBD	TBD	TBD
	Mercury	TBD	TBD	TBD
	Nickel	TBD	TBD	TBD
	Selenium	TBD	TBD	TBD
	Silver	TBD	TBD	TBD
	Thallium	TBD	TBD	TBD
	Tin	TBD	TBD	TBD
	Vanadium	TBD	TBD	TBD
	Zinc	TBD	TBD	TBD

Notes:
1. The Initial characterization has not yet been performed, this table will be updated when data becomes available.
2. The values for Lewisite are reported in mg/kg instead of "weight percent".
3. The values for chlorine were calculated as the total combined weight of chlorine in all of the chlorine-bearing organic compounds.

Table 2-A-2a
H-Filled 155-mm Projectiles, Solid Contents
CHEMICAL AGENT COMPOSITION[1]

AGENT	CHEMICAL CONSTITUENT	Average Value[4]	Maximum Value[5]	Minimum Value[6]
H	**Organic Compounds (Weight Percent)**			
	Agent)	TBD	TBD	TBD
	Thiodiglycol	TBD	TBD	TBD
	1,2-Dichloroethane	TBD	TBD	TBD
	Tetrachloroethene	TBD	TBD	TBD
	1,1,2,2-Tetrachloroethane	TBD	TBD	TBD
	bis [2-(2-chloroethylthio)ethyl] ether (T)	TBD	TBD	TBD
	1,2-*bis* (2-chloroethylthio) ethane (Q)	TBD	TBD	TBD
	Hexachloroethane	TBD	TBD	TBD
	Lewisite[2] (mg/kg)	TBD	TBD	TBD
	1,4-Dithiane	TBD	TBD	TBD
	1,4-Thioxane	TBD	TBD	TBD
	2-Chloroethyl 4-chlorobutyl sulfide	TBD	TBD	TBD
	bis (2-Chloropropyl) sulfide	TBD	TBD	TBD
	Chlorine[3]	TBD	TBD	TBD
	Metals (mg/kg)			
	Aluminum	TBD	TBD	TBD
	Antimony	TBD	TBD	TBD
	Arsenic	TBD	TBD	TBD
	Barium	TBD	TBD	TBD
	Beryllium	TBD	TBD	TBD
	Boron	TBD	TBD	TBD
	Cadmium	TBD	TBD	TBD
	Chromium	TBD	TBD	TBD
	Cobalt	TBD	TBD	TBD
	Copper	TBD	TBD	TBD
	Lead	TBD	TBD	TBD
	Manganese	TBD	TBD	TBD
	Mercury	TBD	TBD	TBD
	Nickel	TBD	TBD	TBD
	Selenium	TBD	TBD	TBD
	Silver	TBD	TBD	TBD
	Thallium	TBD	TBD	TBD
	Tin	TBD	TBD	TBD
	Vanadium	TBD	TBD	TBD
	Zinc	TBD	TBD	TBD

Notes:

4. The Initial characterization has not yet been performed; this table will be updated when data becomes available.
5. The values for Lewisite are reported in mg/kg instead of "weight percent".
6. The values for chlorine were calculated as the total combined weight of chlorine in all of the chlorine-bearing organic compounds.

Table 2-A-2b
HT-Filled 4.2 Inch Mortars, Liquid Contents
CHEMICAL AGENT COMPOSITION[1]

AGENT	CHEMICAL CONSTITUENT	Average Value	Maximum Value	Minimum Value
HT	**Organic Compounds (Weight Percent)**			
	Bis (2-chloroethyl) sulfide (HD)[2]	TBD	TBD	TBD
	bis [2-(2-chloroethylthio)ethyl] ether (T)[3]	TBD	TBD	TBD
	1,2-*bis* (2-chloroethylthio) ethane (Q)[3]	TBD	TBD	TBD
	2-(2-chloroethythio) ethyl 2-chloroethyl ether[3]	TBD	TBD	TBD
	1,2-Dichloroethane[3]	TBD	TBD	TBD
	1,4-Dithiane[3]	TBD	TBD	TBD
	1,4-Thioxane[3]	TBD	TBD	TBD
	Chlorine[4]	TBD	TBD	TBD
	Metals (mg/kg)			
	Aluminum	TBD	TBD	TBD
	Antimony	TBD	TBD	TBD
	Arsenic	TBD	TBD	TBD
	Barium	TBD	TBD	TBD
	Beryllium	TBD	TBD	TBD
	Boron	TBD	TBD	TBD
	Cadmium	TBD	TBD	TBD
	Chromium	TBD	TBD	TBD
	Cobalt	TBD	TBD	TBD
	Copper	TBD	TBD	TBD
	Lead	TBD	TBD	TBD
	Manganese	TBD	TBD	TBD
	Mercury	TBD	TBD	TBD
	Nickel	TBD	TBD	TBD
	Selenium	TBD	TBD	TBD
	Silver	TBD	TBD	TBD
	Thallium	TBD	TBD	TBD
	Tin	TBD	TBD	TBD
	Vanadium	TBD	TBD	TBD
	Zinc	TBD	TBD	TBD

Notes:
1. The Initial characterization has not yet been performed. This table will be updated when data becomes available.
2. Quantitative analysis using calibration standard.
3. Reported as Tentatively Identified Compounds (TICs), a semi-quantitative analysis based on percent of area under the chromatogram response curves.
4. The value for chlorine is determined from analysis.

Table 2-A-2b
HT 4.2 Inch Mortars, Solid Contents
CHEMICAL AGENT COMPOSITION[1]

AGENT	CHEMICAL CONSTITUENT	Average Value	Maximum Value	Minimum Value
HT	**Organic Compounds (Weight Percent)**			
	Chlorine[2]	TBD	TBD	TBD
	Metals (mg/kg)			
	Aluminum	TBD	TBD	TBD
	Antimony	TBD	TBD	TBD
	Arsenic	TBD	TBD	TBD
	Barium	TBD	TBD	TBD
	Beryllium	TBD	TBD	TBD
	Boron	TBD	TBD	TBD
	Cadmium	TBD	TBD	TBD
	Chromium	TBD	TBD	TBD
	Cobalt	TBD	TBD	TBD
	Copper	TBD	TBD	TBD
	Lead	TBD	TBD	TBD
	Manganese	TBD	TBD	TBD
	Mercury	TBD	TBD	TBD
	Nickel	TBD	TBD	TBD
	Selenium	TBD	TBD	TBD
	Silver	TBD	TBD	TBD
	Thallium	TBD	TBD	TBD
	Tin	TBD	TBD	TBD
	Vanadium	TBD	TBD	TBD
	Zinc	TBD	TBD	TBD

Notes:
1. The Initial characterization has not yet been performed. This table will be updated when data becomes available.
2. The value for chlorine is determined from analysis.

TABLE 2-B-1
Metals in Munitions[1] (Metals with Feed Rate Limitations - Module V)

Metals[2]	Sb	As	Ba	Be	Cd	Cr[3]	Pb	Hg	Ag	Tl
Baseline Ton Containers, Agent HD										
TOTAL EMBEDDED METALS[1,4] (pounds)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
TOTAL NON-EMBEDDED METALS[4] (pounds)	0.00862	0.04108	0.64627	0.00929	0.33732	0.20048	2.85397	0.00086	0.00913	0.00932
Metals in Fusible Plugs	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals in Paint[5]	NR	NR	0.63778	NR	0.32875	0.18410	2.83462	NR	NR	NR
Metals in Liquid Agent[6]	0.00825	0.00940	0.00823	0.00841	0.00841	0.00779	0.00763	0.00057	0.00834	0.00841
Metals in Solid Agent Residue[6]	0.00037	0.03168	0.00026	0.00088	0.00016	0.00859	0.01172	0.00029	0.00079	0.00091

Notes:

1 The metals within the munitions' metal are considered to be fixed (embedded, inert) and will not vaporize at furnace temperatures. The values are not included in the Non-Embedded Metals totals.

2 NR – not reported, no information provided.

3 No distinction between different chromium valences (e.g., identification of hexavalent chromium) can be made from the available information.

4 The weight and composition of brass valves associated with ton containers are unknown. Therefore the brass-constituent metals not included in the shown value for embedded metals of a ton container. On Mustard TCs, the fusible plug port has been fitted with a non-fusible solid brass plug in place of the original lead-containing fusible plugs.

5 The non-embedded metals values attributed to the munitions paint is a function of the munitions' surface areas: Ton Container 65.75 ft^2.

6 Based on a ton container filled with 1800 pounds HD, 10% solidified, liquid and solids containing the average metals concentration from 80 samples analyzed from ton containers having a liquid mercury concentration less than one ppm. Metals Concentrations are tabulated in Table 2-A-2.

TABLE 2-B-2
Metals in Munitions[1] (Other Metals of Interest)

Metals[2]	Se	Ni	V	Al	B	Co	Cu	Mn	Sn	Zn
Baseline Ton Containers, Agent HD										
TOTAL EMBEDDED METALS[1,3] (pounds)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
TOTAL NON-EMBEDDED METALS[3] (pounds)	0.02081	0.34913	0.00569	0.06809	0.01688	0.00304	0.08858	0.07670	0.01854	0.05613
Metals in Fusible Plugs	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Metals in Paint[4]	NR	0.32875	NR	NR	NR	NR	NR	NR	NR	NR
Metals in Liquid Agent[5]	0.01636	0.00551	0.00505	0.06157	0.01513	0.00167	0.06140	0.00271	0.01685	0.01581
Metals in Solid Agent Residue[5]	0.00445	0.01487	0.00064	0.00652	0.00175	0.00137	0.02718	0.07399	0.00169	0.04032

Notes:

1 The metals within the munitions' metal are considered to be fixed (embedded, inert) and will not vaporize at furnace temperatures. These values are not included in the Non-Embedded Metals totals.

2 NR – not reported, no information provided.

3 The weight and composition of brass valves associated with ton containers are unknown. Therefore the brass-constituent metals are not included in the shown value for embedded metals of a ton container. On Mustard TCs, the fusible plug port has been fitted with a non-fusible solid brass plug in place of the original lead-containing fusible plugs.

4 The non-embedded metals values attributed to the munitions paint is a function of the munitions' surface area: Ton Container 65.75 $ft^{2.}$

5 Based on a ton container filled with 1800 pounds HD, 10% solidified, liquid and solids containing the average metals concentration from 80 samples analyzed from ton containers having a liquid mercury concentration less than one ppm. Metals concentrations are tabulated in Table 2-A-2.

TABLE 2-B-3
Metals in Munitions[1] (Metals with Feed Rate Limitations - Module V)

Metals[2]	Sb	As	Ba	Be	Cd	Cr[3]	Pb	Hg	Ag	Tl
155mm Projectiles, Agent H, Full Tray of 48 Projectiles										
TOTAL EMBEDDED METALS[1,4] (pounds)	NR	NR	NR	NR	NR	0.217	NR	NR	NR	NR
TOTAL NON-EMBEDDED METALS[4] (pounds)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Metals in Paint[4]	NR	NR	1.35	NR	0.696	0.390	2.44	NR	NR	NR
Metals in Liquid Agent[5]	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Metals in Solid Agent Residue[5]	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Notes:
1. The metals within the munitions' metal are considered to be fixed (embedded, inert) and will not vaporize at furnace temperatures. The values are not included in the Non-Embedded Metals totals.
2. NR – not reported, no information provided. TBD-To Be Determined during Initial Characterization Sampling and Analysis.
3. No distinction between different chromium valences (e.g., identification of hexavalent chromium) can be made from the available information.
4. The non-embedded metals values attributed to the munitions paint is a function of the munitions' surface areas: 155mm projos 2.9 ft^2; 48 each.
5. Based on a 155mm projectile filled with 11.7 pounds of agent H, 75% solidified, liquid and solids containing the average metals concentrations from initial characterization.

TABLE 2-B-4
Metals in Munitions[1] (Other Metals of Interest)

Metals[2] 155mm Projectiles, Agent H, Full Tray of 48 Projos	Se	Ni	V	Al	B	Cu	Mn	Sn	Zn
TOTAL EMBEDDED METALS[1,4] (pounds)	NR	0.434	NR	NR	NR	0.217	0.608	NR	NR
TOTAL NON-EMBEDDED METALS[4] (pounds)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Metals in Paint[4]	NR	0.696	NR	NR	0.696	0.390	2.44	NR	NR
Metals in Liquid Agent[5]	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Metals in Solid Agent Residue[5]	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Notes:
1. The metals within the munitions' metal are considered to be fixed (embedded, inert) and will not vaporize at furnace temperatures. The values are not included in the Non-Embedded Metals totals.
2. NR – not reported, no information provided. TBD-To Be Determined during Initial Characterization Sampling and Analysis.
3. No distinction between different chromium valences (e.g., identification of hexavalent chromium) can be made from the available information.
4. The non-embedded metals values attributed to the munitions paint is a function of the munitions' surface areas: 155mm projos 2.9 ft^2; 48 each.
5. Based on a 155mm projectile filled with 11.7 pounds of agent H, 75% solidified, liquid and solids containing the average metals concentrations from initial characterization

TABLE 2-B-5
Metals in Munitions[1] (Metals with Feed Rate Limitations - Module V)

Metals[2]	Sb	As	Ba	Be	Cd	Cr[3]	Pb	Hg	Ag	Tl
4.2" Mortars, Agent HT, Full Tray of 96 Mortars										
TOTAL EMBEDDED METALS[1,4] (pounds)	NR	NR	NR	NR	0.042	4.49	NR	NR	NR	NR
TOTAL NON-EMBEDDED METALS[4] (pounds)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Metals in Paint[4]	NR	NR	1.75	NR	0.902	0.501	3.15	NR	NR	NR
Metals in Liquid Agent[5]	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Metals in Purple Paste Agent Residue[5]	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

Notes:

6. The metals within the munitions' metal are considered to be fixed (embedded, inert) and will not vaporize at furnace temperatures. The values are not included in the Non-Embedded Metals totals.
7. NR – not reported, no information provided. TBD-To Be Determined during Initial Characterization Sampling and Analysis.
8. No distinction between different chromium valences (e.g., identification of hexavalent chromium) can be made from the available information.
9. The non-embedded metals values attributed to the munitions paint is a function of the munitions' surface areas: 4.2" Mortars are 1.88 ft^2; 96 each.
10. Based on preliminary information a 4.2" Mortars filled with nominal 5.8 pounds of agent HT, 34% of mortars have a paste heel weighing 0.19 lbs, liquid HT and paste containing the average metals concentrations from initial characterization.

TABLE 2-B-6
Metals in Munitions[1] (Other Metals of Interest)

Metals[2] 4.2" Mortars, Agent HT, Full Tray of 96 Mortars	Se	Ni	V	Al	B	Cu	Mn	Sn	Co	Zn
TOTAL EMBEDDED METALS[1,4] (pounds)	NR	8.59	NR	NR	NR	NR	12.03	NR	NR	NR
TOTAL NON-EMBEDDED METALS[4] (pounds)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Metals in Paint[4]	NR	0.902	NR	NR	NR	NR	NR	NR	NR	NR
Metals in Liquid Agent[5]	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Metals in Purple Paste Agent Residue[5]	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

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Notes:

6. The metals within the munitions' metal are considered to be fixed (embedded, inert) and will not vaporize at furnace temperatures. The values are not included in the Non-Embedded Metals totals.
7. NR – not reported, no information provided. TBD-To Be Determined during Initial Characterization Sampling and Analysis.
8. No distinction between different chromium valences (e.g., identification of hexavalent chromium) can be made from the available information.
9. The non-embedded metals values attributed to the munitions paint is a function of the munitions' surface areas: 4.2" Mortars are 1.88 ft^2; 96 each..
10. Based on preliminary information a 4.2" Mortars filled with nominal 5.8 pounds of agent HT, 34% of mortars have a paste heel weighing 0.19 lbs, liquid HT and paste containing the average metals concentrations from initial characterization.

Table 2-C-1
ENERGETIC/AGENT NOMINAL WEIGHT
FOR
CHEMICAL AGENT MUNITIONS/BULK CONTAINERS

MUNITION	MODEL /AGENT	DIMENSIONS			AGENT		BURSTER			PROPELLANT		FUSE MODEL	OTHER ENERGETIC COMPONENTS
		DIAMETER	LENGTH (INCHES)	WEIGHT (LBS)	TYPE	WEIGHT (LBS)	MODEL	EXPLOSIVE	WEIGHT (LBS)	MODEL	WEIGHT (LBS)		
4.2-inch Mortar	M2	4.2 inch	21.0	24.67	HD	6.0	M22	Tetryl	0.14	-	-	M8	M2 Primer
				24.47	HT	5.8							
155-mm Projectile	M104	155 mm	26.8	98.9	H	11.7	M6	Tetrytol	0.414	--	--	--	
	M110												
Ton Containers	Agent HD	30.1	85.1	3,400	HD	1,800	--	--	--	--	--	--	--

NOTES:
NA = Information not available;
H, HD, and HT = Mustard
TNT = 2,4,6-trinitrotoluene; $CH_3C_6H_2(NO_2)_3$
Tetryl = 2,4,6-trinitrophenylmethylnitramine; $(NO_2)_3C_6H_2N(NO_2)CH_3$
Tetrytol = 70% Tetryl, 30% TNT

Table 2-C-2
COMPOSITION OF REACTIVE MATERIAL IN MUNITIONS

MUNITION	COMPONENT			WEIGHT	COMPOSITION
M2 (4.2-inch mortar)	1.	Fuze, M8			
		a.	M22 Burster Assembly	65.2 grams	Tetryl[d]
	2.	Detonator, M18			
		a.	Upper Charge	50 mg	Overall Mixture: 33.5% Potassium Chlorate, 32.2% Antimony Sulfide, 28.3% Lead Azide, 5.0% Carborundum
		b.	Intermediate Charge	157 mg	Lead Azide
		c.	Lower Charge	70 mg	Tetryl[d]
		d.	Relay Charge	130 mg	Tetryl[d]

Notes:
[d] Tetryl = 2,4,6-trinitrophenylmethylnitramine; $(NO_2)_3C_6H_2N(N)_2)CH_3$